The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXXVI. February 6, 1937 No. 919

Alcohol Production

ALCOHOL that is produced for general industrial work is subject to severely economic laws and can be used in chemical manufacture only if its cost of production is sufficiently low for the purpose. Power alcohol, however, like certain other unfortunate substances, has been made a piece on the political chessboard, and it is well to recognise that if its production economics be not sound, at any time an unexpected political move may result in the piece being taken and put quietly back into the box. The potential market for power alcohol is immense and it is possible that there is no product of the chemical industry for which the potential tonnage is greater than that of fuel oil, whether it be derived from hydrogenation, from water gas or from fermentation. It is the more necessary that there should be a proper understanding of the economic factors involved.

It has been proposed to use two of the series of aliphatic alcohols in the internal combustion engine. Methyl alcohol is produced from coke or from coke oven gas by the well-known methanol reaction: $CO + 2H_2 = CH_3HO$; ethyl alcohol is produced by fermentation generally from potatoes or from sugar molasses. So far as we are aware, no commercial method has yet been discovered for commercially manufacturing ethyl alcohol synthetically, for example, by the purely hypothetical reaction: $2CO + 4H_2 = C_2H_5OH + H_2O$. That is a pity, for if the calorific value of No. 1 Petrol, as expressed in therms per gallon, be taken as 1.5, that of motor benzole is 1.58, of ethyl alcohol 0.91, and of methyl alcohol but 0.68; likewise, whereas the useful highest compression ratio of benzole is above 7, and of ethyl alcohol 7.5, that of methyl alcohol is 5.2. It must be recorded against the insistence on the higher C.V. of ethyl alcohol that J. E. Osterrieth, in his Institute of Fuel paper in 1933, stated that petrol-alcohol mixtures containing up to about 20 per cent of methyl alcohol do not give a higher fuel consumption for a given power output than petrol alone, a circumstance which he ascribed to the higher latent heat of the alcohol, the higher volumetric efficiency and to a slight advantage in thermal efficiency.

The economic position of power alcohol has been surveyed recently in a review of world power alcohol policy by Mr. H. Webster, published in the "Petroleum Times." This discussion deals primarily with ethyl alcohol, and remarks that there is nothing novel in the use of alcohol for power purposes since all that is needed is the dehydration of the alcohol produced in ordinary industrial plants. Mr. Webster points to the general subsidisation of alcohol in all countries of the world at the expense of petroleum, the United States being an exception. He shows that the average yield of 99.5 per cent. alcohol from one ton of English potatoes is 23 gal., so that if the potatoes can be purchased for "as little as £2 a ton, the cost of basic material alone is about 1s. 9d. per imperial gal. of alcohol produced." The subsidies are such that even in Poland where potatoes have been available this year at 15s. a ton, a subsidy has been necessary. In Germany the subsidy has amounted to £71 3s. per English ton, and in France to £38 13s.; "it is beyond denial that these are enormous prices to pay for securing internally not more than 11 per cent. of its motor fuel requirements in the case of Germany and 9 per cent. in the case of France."

Space does not permit of quoting Mr. Webster's figures for the 18 countries dealt with, but some should be mentioned. In the United Kingdom he claims that the subsidy amounts to 8d. a gal. by reason of the hydrocarbon oil tax and a further $8\frac{3}{4}$d. under the Revenue Act of 1906, making 1s. $4\frac{3}{4}$d. in all. In the Irish Free State where five Government factories are under construction for the manufacture of power alcohol, "the price to be charged to motor fuel distributors is said to be 3s. 6d. per gal. The price of first grade gasoline is about 1s. 8d. ex pump." In the Philippine Islands, producers of sugar, the subsidy in the form of a gasoline tax is $4\frac{1}{2}$d. a gal., and in Cuba 9.7d. a gal. In Japan the alcohol policy is being pursued with energy and apparently potatoes are to be used for the purpose; several refineries are to be erected at a cost of 5 million yen. Many other countries do not appear to levy a direct tax upon imported petrol, but insist that a proportion of alcohol shall be blended. This world alcohol policy is to be correlated with the concurrent development of hydrogenation and of the production of oil by the Fischer-Tropsch process. It it all a part of that economic nationalism and fear of shortage of supplies in war time that is likely to hamper trade recovery by encouraging tariff barriers.

Where does the chemical industry stand? Is there any prospect that within the next ten years alcohol will be produced sufficiently cheaply to compete with petrol if helped by a moderate tax no greater than, say, 4d.? Will the present official encouragement of home-produced fuels persist? We do not profess to answer these questions which are clearly beyond the scope of our direct answer, but we do suggest that there was never greater need than now for intensive research into all methods of liquid power production by means of the numerous carbon monoxide-hydrogen possibilities in order to discover means whereby our large manufacturing units could continue to operate even if official encouragement should be withdrawn.

Notes and Comments

Preparing for the Coronation

IN view of the number of buildings which are being cleaned in preparation for the Coronation, it is of interest to note in the annual report of the Building Research Board a warning against the use of chemical aids for cleaning masonry. Acids are sometimes employed for this purpose, but acids are commonly recognised to be dangerous. That alkalies are equally dangerous is not so well understood. In fact, the suggestion is sometimes advanced that the alkali is beneficial in that it neutralises deleterious acid constituents absorbed from the air; but this suggestion is misleading. Though their use cannot be given unqualified recommendation even for this purpose, cleaning powders containing alkaline constituents can be used on dense stones like marble without ill effect, provided the material is thoroughly wetted before applying the powder and thoroughly rinsed afterwards. But care is necessary to avoid bringing the powder in contact with neighbouring, more absorbent materials. Examples of the deleterious effects are commonly to be seen in stone walls and door jambs adjoining marble steps. Sometimes the salts can be seen to have penetrated through the walls. In one instance, a short flight of marble steps in a corridor was outlined on the main façade of the building by efflorescent salts and a pitting of the surface of the stone.

Who Makes Chemical Engineers

THE Chairman of the American Institute of Chemical Engineers' education committee answered this question so aptly in a recent students' bulletin that it is worth while repeating some of his statements. A chemical engineer makes himself. Only by his own conscious efforts, continued over a period of years much longer than he spends in college, may he finally become an honest-to-goodness chemical engineer. Those who have spent years in the classroom and laboratory working with would-be chemical engineers, know that a student is finally "on the way" when he takes his own education in hand. Once he really gets a grip on the idea that, after all, he is doing the job of educating himself for his chosen profession, a remarkable change comes over him. He is no longer a passive listener to a few more or less competent instructors, or a casual reader of text-book assignments. He awakens to the fact that he must learn the fundamental sciences well—chemistry, mathematics, physics, and their applications in his field of engineering—for any practising chemical engineer will tell him that only thus may he hope to become a successful member of the profession. But he learns many other things than these. He learns how things are done in engineering and why. He discovers that almost every practical engineering job involves choosing amongst several alternative methods of procedure, a selecting of equipment from a wide variety available, a balancing of effects, an adjusting of a complex set of interrelated factors in such a way as give the most economic result. And as he comes to see clearly what chemical engineering really is, he sees also what he should do about his education. If anything causes him to forget the fact that he must somehow continue to get an education, he is doomed.

Chemists Who Do Not Want War

WE have on more than one occasion deplored the fact that war talk is too fashionable, and we congratulate the British Association of Chemists upon finding room in the latest issue of its "Chemical Practitioner" for a timely article on the prevention of war. Popular opinion visualises a war in which nearly every chemist will be engaged, in one capacity or another, in some form of chemical warfare, but here we have welcome evidence that there are chemists who do not want war. It is futile to persist in the purely pacifist suggestion that every chemist should resign from his post, for the internal confusion resulting from any such action might tempt a foreign power to launch a sudden knock-out blow, thus precipitating a calamity which pacifism was expressly designed to prevent. The complexity of the issue, involving as it does, so many and varied factors which have to be considered by the chemist in deciding his attitude to war, should not deter a man trained in the methods of science from applying these same methods to the solution of the most important problem which confronts mankind to-day, namely, how to prevent war. The chemist who is able "to identify the constituents of the given mixture" should also be able to identify the constituents of the present social mixture, if he will but try. It should not be an insuperable task to recognise those forces in society, which nationally and internationally are consistently on the side of peace and having done so, to combine forces in a big united campaign against the small but powerful and well-organised groups, which consciously or unconsciously, are driving humanity towards destruction.

Smoke Abatement

WHILE some sections of the chemical industry may contribute in a small measure to the smoke problem, the industry as a whole occupies a unique position in that it assists many of its kindred industries to reduce the volume of smoke emitted from their works and to render such emissions as are irreducible less injurious to the public health. Smoke abatement is, indeed, largely a chemical problem, and the more this fact is realised by those who are striving for a purer atmosphere the greater are the prospects of success. The National Smoke Abatement Society has issued its seventh annual report this week, in which it is recorded that the increased general interest in the state of the atmosphere noted in previous reports continues to be maintained. A total of 42 additional local authorities have joined the Society, bringing the total to 105, representing a combined population of over 13,500,000, or more than a third of the population of England and Wales. Lack of funds has restricted the amount of propaganda and other useful work undertaken by the Society, and in the year under review the financial position was maintained by a reduction in expenditure rather than by any considerable increase in receipts. In addition to the Society, the regional committees and the committee for the investigation of atmospheric pollution of the Department of Scientific and Industrial Research create, by their activities and reports, considerable public interest.

Plastics in Times of National Emergency

A Symposium Organised by the Institute of the Plastics Industry

A SYMPOSIUM on "Plastics," organised by the Institute of the Plastics Industry, was held at the Institution of Mechanical Engineers, London, on January 28. The chair was taken by Mr. W. A. S. Calder, in the unavoidable absence of Dr. Herbert Levinstein, who had intended to be present. Major F. D. Maclean, chairman of the Institute of the Plastics Industry, was also present. Nine papers were presented in three groups of three, and the respective chairmen of the groups were Mr. H. Todd-Thornbery (governing director, Griffiths Bros. and Co. (London), Ltd.), Mr. Foster Sproxton (director, British Xylonite Co., Ltd.), and Mr. H. V. Potter (managing director, Bakelite, Ltd). The object of the symposium was to place on record an account of the present position of the plastics industries, the uses to which plastics materials are put, figures of production and use and, finally, to emphasise the national importance of the plastics industry in times of national emergency and in some way to bring to the notice of the Government Departments concerned the necessity for taking steps to ensure adequate supplies of the necessary raw materials in such circumstances.

Natural Resins and Shellacs

The first paper was by Mr. A. J. GIBSON (special officer, Lac Inquiry), who dealt with natural resins and shellacs. After giving details of origin and figures of production and consumption, he said that the principal outlet for rosin was in the paper sizing industry, which took 35 per cent. of the annual output; soap took 25 per cent.; varnishes and printing inks took another 25 per cent., and a mass of industries, of which the most interesting were metallic resinates and a rosin-synthetic resin compound, absorbed the remaining 15 per cent. Rosin was also used for binding the shrapnel in shells, the rosin being pourned in hot and allowed to cool. Research on a very large scale organised by the large "naval stores" corporations in the United States, and on a smaller scale by the French resin industry, was finding new uses for rosin at a considerable rate. After a series of lean years, prices were going up and the industry to-day was in a sound position, largely due to the fact that the products had been graded and sold against standards for nearly 50 years.

The copals found their principal use in oil-varnishes and protective coatings. Lac products, including shellac, as true thermo-plastic materials with some unique properties, had until recently found their principal outlet in gramophone records, the second largest user being protective and insulating coatings. Other resins were also used in varnishes and protective coatings. Standardisation and research, either on the initiative of the Governmentts concerned, by statutory committees or organisations set up for the purpose, had and would do much to improve the raw materials.

Dependent on Foreign Sources

The brief account given showed that the natural resins used in the United Kingdom are all imported and that, apart from lac and very small quantities of rosin and some other resins, the United Kingdom is largely dependent on foreign sources of supply. The normal stocks held in this country are small. Expansion in production in the producing countries at any given moment would take time, more especially where fresh tapping was involved, as in the case of rosin, dammar and kauri. It had, however, been demonstrated that lac exports could easily go up to 20 per cent. in any one year, due to large quantities of crude lac, *i.e.*, sticklac, being carried forward customarily from year to year, a phenomenon which not only astounded but confounded the London speculators who attempted a shellac corner in 1933-34. The remedy or remedies applicable to the conditions as regards supplies, shortage of which proved serious in the last national emergency, could only be suggested. The holding of adequate stocks in the United Kingdom was a simple solution, but involved the tying up of a great deal of money. A conference between the authorities concerned in India, the Colonies, and the Commonwealths of Australia and New Zealand would ensure the best possible utilisation of the existing Empire sources of natural resins and their expansion. The Imperial Economic Committee should organise such a conference.

Dr. L. A. JORDAN (director, Paint and Varnish Research Association) dealt with raw materials for the paint and varnish industry. He explained that the paint and varnish industry was represented in the symposium because it utilised resins—natural and synthetic.

Bitumen Plastics

The final paper in the first group dealt with bitumen plastics, the author being Mr. C. G. F. Pritchett (director, Pritchett and Gold and E.P.S., Ltd.), who said that bitumen plastics are one of the oldest types of plastics, and are still used where large mouldings are required and where low cost rather than quality was the determining factor. There was a large variety of compositions the cost of which varied considerably, but an average cost might be taken as about 1½d. per lb., which was very attractive for certain classes of work. Another advantage was that such compositions could be made which were much more resistant to dilute acids than any of the ordinary thermo-setting resins. A reasonably fair estimate of the total output of bitumen plastics of all types was about 6,000 tons per annum, of which 5,000 tons were used for battery cases and the remainder over miscellaneous small products. The trend of development was in the field of large mouldings, apart from battery cases. The chemical industry should be a field for such articles as acid-proof tanks and fittings, if only the requirements could be sufficiently standardised to justify the large expenditure on moulds which would undoubtedly be required.

Production of Casein

The second group of papers dealt with casein plastics, cellulose ester plastics, and cellulose ethers.

Mr. T. L. BIRRELL (British Xylonite Co., Ltd.) briefly described the manufacture of Erinoid and Lactoid products, high grade rennet casein in powder form being the basic material. The rennet casein, of course, is made from skimmed milk and this industry reaches large dimensions in France, Denmark, Holland, New Zealand and the United States. The world production of casein is estimated at about 70,000 tons, but it is not known what proportion of it is rennet casein, which, for plastics manufacture must pass a very stringent specification. Until recently, practically no casein of suitable quality and price was produced in Great Britain. Efforts, however, were being made to correct this position. For the production of 1 lb. of casein, about 3½ gallons of milk were required. So far as this country's production of dairy produce was concerned casein plastics took very little, but in any country the existence of a demand which was able to absorb the products made from an excess of milk production helped to stabilise the dairy industry.

After mentioning some of the well-known properties of casein plastics, Mr. Birrell said the position of the industry in this country at a time of national emergency was difficult to forecast. If there was any question of an acute shortage of food, it was probable that casein could not be spared for the plastics industry, but if casein plastic was required for national purposes and imported casein was available it would be necessary to spare the shipping capacity to bring the casein into the country. Both in England and in France the casein

plastics industry was carried on during the period of 1914-18, the British industry being forced to import casein. It was to be hoped that in similar circumstances in the future the home casein industry, in conjunction with Empire producers, would be able to meet the emergency. The main purpose of this paper, however, it was added, was not to forecast what would and would not be necessary, but to place the facts on record so that if casein plastics were necessary in time of emergency, the raw materials might be forthcoming.

Cellulose Ester Plastics

Dr. V. E. YARSLEY then dealt with cellulose ester plastics and after briefly describing the manufacture of nitrocellulose and cellulose acetate, said that the requisite plant for the manufacture of cellulose ester plastics can all be manufactured in this country. The important raw materials for the two cellulose ester plastics were cellulose, either as cotton linters or as wood pulp, sulphuric, nitric and acetic acids, acetic anhydride, camphor, alcohol, acetone and the various plasticisers for cellulose acetate. As regards cotton linters, Empire cotton could easily meet the requirements of the United Kingdom in linters. The use of wood pulp for the production of cellulose esters had developed considerably during the past few years both in America and Sweden, but so far the American product appeared to be the more suitable for esterification.

The products obtained from wood pulp were not equal in quality to those from first grade cotton linters, but they could be used in a variety of plastic materials. Both cotton linters and wood pulp had to be imported, and in a time of national emergency would have a claim on shipping. In view of this, it was strange that no attempt had been made to encourage the production of home grown cellulose. Owing to the slow growth of timber for wood pulp, the solution seemed to be in quick growing cellulose fibre and the like. The acids required for the nitration of cellulose were both available in this country.

The problem of camphor supplies had changed entirely during the past five years. Before the war supplies had to be imported, but since then British celluloid manufacturers determined to have their own supply of camphor if possible, and after many years of expensive research now had a process in operation which was capable of meeting not only the needs of the home industry for celluloid, but also the home and Empire needs in pharmaceutical camphor. Unfortunately, however, the oil of turpentine which was the starting point in camphor manufacture was subject to the hydrocarbon oil duty of 8d. per gallon, and as long as the industry was subject to that tax its future would be jeopardised.

Cellulose ethers were discussed in the third and last paper in the second group, the author being Dr. James Craik, of Imperial Chemical Industries, Ltd., Only two of the four cellulose ethers now manufactured in this or other countries fell within the scope of the paper, however, *viz.*, benzyl and ethyl derivatives.

Benzyl Cellulose

Referring first to benzyl cellulose, which is manufactured in this country, mention was made of the present uses of this for moulding powders, pigmented dopes, transparent wrapping films, and the waterproofing of fabrics and films. The raw materials required were cellulose, sodium hydroxide, benzyl chloride and petroleum, but the latter might be replaced by alcohol. Sodium hydroxide and alcohol should readily be available, but in times of national emergency it was not likely that unlimited quantities of toluene would be procurable for the manufacture of benzyl chloride owing to the requirements for T.N.T. It had been proposed that benzyl chloride might be prepared from benzene, formaldehyde and hydrochloric acid, but so far as was known, no particular success had been achieved, and in any event benzene would be required for other purposes. An important use of benzyl cellulose in war time would be for aeroplane dope.

Coming to ethyl cellulose, Dr. Yarsley said he was not aware that this was manufactured in this country, but we were in possession of the technical knowledge to carry out such manufacture at short notice.

The third group of papers discussed phenolic and cresylic types of plastics, amino type plastics, and some of the newer plastics. The first speaker was Mr. George Dring (Bakelite, Ltd.), who dealt with phenolic and cresylic types of plactics, and who recalled that it is 30 years since phenol-formaldehyde synthetic resins were first made and sold commercially. Their sales had reached something like 15,000 tons per annum in this country, the figure in Germany was about the same, and in America, where the commercial development of these materials originated, about treble that amount, giving a total world output of roughly 80,000 per annum. The largest bulk of manufactured articles were those which were moulded from wood flour filled materials. Large and increasing quantities, however, were made with other fillers such as cotton fibre, cotton fabric and other fibrous materials, different types of filler being used for special purposes. The second largest use of phenol-formaldehyde resins was in the manufacture of laminated products in the form of sheets up to 7 and 8 ft. long by 3 ft. 4 in. wide, and in thicknesses from 0.003 in. to single thicknesses of 5 in. and over.

Supplies of Raw Materials

Passing from the composition and application aspects, Mr. Dring dealt at some length and with some emphasis with the question of supplies of raw materials and skilled craftsmen for the trade. He pointed out that the most important raw materials for the manufacture of phenol-formaldehyde products were phenols and cresols, formaldehyde, wood flour, paper and fabric materials. During the past year the prices of cresylic acid had risen steadily due to heavy buying in the international market by foreign countries, and although there had not been a shortage of raw materials for the plastics industry, prices had increased by more than 50 per cent.

In the second paper, on amino plastics, Mr. Peter K. Chance (director, British Industrial Plastics, Ltd.) said the important raw materials were urea, thiourea and formaldehyde, the former being available here in large quantities. Thiourea could be made from imported cyanamide or from sulphocyanide of ammonia, of which ample supplies were available at gasworks in this country. In the case of amino plastic moulding powders, an additional constituent was cellulose which was purchased either in the form of ground wood flour or of pressed sheet resembling a thick white paper. The principal sources of supply are the Scandinavian countries and Canada, and there would obviously be difficulties in the case of war.

The final paper in the third group was by Mr. A. Renfrew and Dr. A. Caress (Imperial Chemical Industries, Ltd.) and dealt with a number of possible new plastic materials of various kinds on which some work had already been done.

Points from the Discussion

Mr. H. TODD-THORNBERY (chairman, first group of papers) suggested that the raw materials for the plastics industry should, in a national emergency, be included in the category of munitions and added that it was only by co-operation, forethought and planning on the part of the manufacturing interests and the Government Departments concerned that it would be possible to avoid a repetition of the scramble for raw materials and its consequent grievances and other troubles among individuals which were experienced during the period 1914-18.

Mr. FOSTER SPROXTON (chairman of second group), said the process by which camphor, an important raw material of the plastics industry, was now produced in this country was British in origin and development. He added that the symposium was representative of the industry as a whole and no attempt had been made to extol one branch at the expense of another.

Mr. F. M. POTTER, commenting on the suggestion of appealing to the Government to do something with regard to the raw materials of the plastics industry, suggested there were better ways of dealing with this matter than that. There were trade organisations and the best way was to appeal to them to do something about the matter, because the hands of the Government at the moment were more than full for them to do anything on the lines suggested.

Dr. REDFARN, commenting on the remark in the paper by Dr. Yarsley that cellulose might be synthesised by the treatment of formaldehyde with ultra-violet light, said he had had the good fortune to be associated with work on that problem, but did not think that in the near future or even the distant future it would ever be possible to make cellulose in that manner. As regards the use of tar acids, besides phenol and the cresols, for making moulding powders, he said moulding powders which would be satisfactory could be made from high boiling tar acids.

Dr. BARRON, speaking on the suggestion that representation should be made to the Government to take steps to ensure adequate supplies of raw materials, suggested that nothing was likely to be accomplished in that direction until the public was made aware of the public importance of plastics. Then pressure would be brought to bear upon the Government by force of public opinion. Owing to lack of propaganda on the part of the plastics industry, the public had very little knowledge of the national or other importance of plastics and in many cases thought that an article made of plastics material was some new form of wood.

Mr. F. W. CLARKE said that although a great deal had been put forward as to improving the available supplies of raw materials for the plastics industry in time of national emergency, he wondered how many of the factories producing these raw materials would be standing after a very short while. He suggested that the real answer to this question was reasonable storage; this was being talked about in connection with oil and it was time we talked about it in contion with other raw materials, but the storage should not be all in one spot.

Phenol from Low Temperature Carbonisation

Commander C. BUIST sent a letter in which he put forward the claim of the low temperature carbonisation industry in connection with the production of phenol, remarking that some fractions of oil produced by low temperature carbonisation had a content of crude phenol as high as 48 per cent. The output of his company for 1937, he said, would probably exceed 5,000 tons of refined tar acid, and he also suggested that this quantity would be doubled in five years time. At the present time most of the output of his company was being exported to America, for use in the manufacture of disinfectants and in connection with ore flotation processes and very little was finding its way into the plastics industry.

Mr. A. W. ROWELL remarked that in case of emergency phenol would undoubtedly be commandeered for explosives purposes, but he believed that even if a war started in ten years time there would not be on the files of the War Office the necessary instructions for producing phenol. That, however, was the biggest obstacle and it was obvious that the Plastics Federation and other people representing the industry should help to plan out the steps to take in the case of an emergency simply because the Government did not know.

Mr. G. DRING said the synthetic resin industry had taken a great deal of interest in the question of tar acids from low temperature tar and had done a considerable amount of work on the particular materials, but he believed it was generally agreed by everybody concerned—both here and in America—that low temperature tar acids were unsuitable for the manufacture of synthetic resins at the present time. They were largely unsaturated and much slower than the corresponding fraction from high temperature tar. The only possibility which he saw of using low temperature tar acids was by cracking. A large amount of work had been done by Sir Gilbert Morgan, at Teddington, in order to find out the exact composition of tar acids from low temperature tar, and everyone was desirous that some means should be found for using such a very large potential supply of tar acids.

Mr. N. J. L. MEGSON, whilst agreeing with Mr. Dring's views regarding tar acids from low temperature carbonisation, said the fact that they were slower might not be a matter of such great importance in cases of emergency, because a lower grade resin might possibly answer purposes for which now first class resins were asked.

At the conclusion of the discussion the question of making representations to the Government, urging them to take steps to ensure an adequate supply of raw materials for the plastics industry, in the event of a national emergency, was dealt with. The general view was held that it would be unwise to go direct to the Government in this matter and eventually, although a formal resolution was not passed, it was agreed that the British Plastics Federation, the Society of Chemical Industry, and other interested organisations, should be asked to go into the matter and take such further steps as they might think necessary.

Letter to the Editor

British and Foreign Patents

SIR,—I was interested to read in the leading article in THE CHEMICAL AGE of December 26, 1936, a reference to the comments of Professor J. F. Thorpe and Dr. E. F. Armstrong on the subject of the preference shown in this country for inventions of foreign origin rather than for processes devised in Great Britain.

A striking example of this occurs in the same issue in a later article, viz., that on "Conditions in the Heavy Chemical Industry in 1936," by Mr. P. Parrish. Under the heading "Sulphur" reference is made to processes for the recovery of SO_2 and sulphur from waste gases, and prominence is given to the "Sulphidine" process developed by the Lurgi Gesellschaft of Frankfurt. There is also a reference to the early work of Imperial Chemical Industries in this field, but the later important developments receive no mention whatever. I refer, of course, to the development of the basic aluminium sulphate process, *vide*. B.P. 445,711, the formation of the new company, Sulphur Patents, Ltd., as an outcome of the collaboration of I.C.I. with Bolidens G.B. of Sweden, and the starting of the liquid SO_2 plant at the copper smelter of the Outokumpu Oy., at Imatra, Finland. This latter uses the I.C.I. process of B.P. 445,711, and was designed for the Finnish concern by the technical staff of I.C.I. The designed capacity is 52 tons of liquid SO_2 per day from waste gases containing 5 per cent. of SO_2, and production was commenced in April, 1936. A notice to this effect was communicated to the technical press of Great Britain (and published in THE CHEMICAL AGE of August 22, 1936, page 168), the United States of America and the principal continental countries in August, 1936, when it was stated that further details could be obtained from Sulphur Patents, Ltd., c/o I.C.I. (Fertiliser and Synthetic Products), Ltd., Billingham, Co. Durham.

This has the appearance of being a clear instance of the preference of the Englishman for the inventions of "every country but his own" to which reference has already been made, although in Mr. Parrish's case the oversight was, we are sure, unintentional. I would also like to draw your attention to the fact that a pilot SO_2 concentration plant (20 tons SO_2 per day) is in operation at Billingham, and that a liquid SO_2 plant is under construction at Manchester.

We have in course of publication a brochure describing the various processes the exploitation of which is controlled by Sulphur Patents, Ltd., and in the near future we shall be in a position to furnish copies of this to any of your subscribers who may be interested.—Yours faithfully,

D. H. B. WRIDE,
Director, Sulphur Patents, Ltd.
c/o I.C.I. (Fertiliser and Synthetic Products), Ltd.,
Billingham.

Chemical and Allied Trades at Manchester

Points from the Annual Reports of the Chamber of Commerce

MANCHESTER Chamber of Commerce has issued its annual reports for 1936. The Chemical and Allied Trades Section (of which Mr. Forrest Hewit is chairman) states that despite the high figures reached by British export trade during the past twelve months it is a matter of regret that a comparable result affecting the chemical industry cannot be recorded. Total exports of chemicals, drugs, dyes and colours decreased from £21,328,503 in 1935 to £21,099,090 during 1936. On the other hand imports increased over the same period from £11,601,484 to £12,584,235.

Although the exports of chemical products to Germany and the United States during the year reveal a substantial increase, it cannot be overlooked that our imports of chemicals from Germany are more than ten times the amount in value of our exports to that market, and from the United States about twice as much as their imports from us. The actual respective increases in our exports to the two countries were 16 and 46 per cent., and our imports during the same period increased by 15 per cent. and 13 per cent. respectively. Dyestuffs and carbon blacks again showed the principal increases among imports whilst heavy falls were recorded in ammonium sulphate which fell to £1,293,283 as compared with £1,494,956 in 1935, and in copper sulphate which decreased by £103,639 to £380,597 in 1936. Italian purchases of copper sulphate fell from £40,515 to £45—a direct result, no doubt, of the imposition of sanctions; exports to other foreign countries, excluding France and Greece, fell by £37,433. The overseas demand for caustic soda also showed some weakening exports falling from £1,250,748 to £967,585. Japan's takings decreased by £64,307 and other foreign countries, excluding Argentina and Brazil by £103,341.

Duty on Light Hydro carbon Oils

The section committee was asked for its support in connection with a case for the repeal of the duty or light hydrocarbon oils prepared by the National Federation of Associated Paint, Colour and Varnish Manufacturers of the United Kingdom, and other organisations. The case was examined with care by the committee, and much stress was laid on the heavy burden which the duty of 8d. per gal. imposed upon the producing interests of the country. It was, therefore, decided, with the approval of the board of directors, that support be given to the case for the repeal of the duty.

In the last report of the section, attention was drawn to the fact that the chairman was a member of a deputation which waited upon the Chief Economic Adviser to H.M. Government (Sir Frederick Leith-Ross) prior to his departure to the Far East. In October a further deputation from the Chamber, in which the chairman again took part, received a private report from Sir Frederick of the experience of his tour. The meeting took place at the offices of the Board of Trade. A private report of the proceedings may be inspected by interested members who refer to the secretary.

At the last annual meeting of the section, it was reported that the Chamber was collaborating in the formation of a northern branch of the Institution of Petroleum Technologists. At a well attended meeting of representatives of all interested bodies, held at the Chamber in February, the northern branch was actually established. The section is allowed to have two representatives to serve on the committee of the branch, and Lt.-Col. F. I. Bentley, who is chairman of the Oil Manufacturers and Refiners sub-committee, was appointed at the annual meeting of the section last year, and Mr. J. E. Bennion, who had been responsible for the organisation of the meetings leading up to the founding of this branch and was the actual secretary of the branch, was appointed as the Chamber's second representative at a meeting of the executive committee.

Sympathetic reference is made in the report to the death of Mr. F. T. T. Reynolds, who was a member of the executive committee of the Chemical and Allied Trades section for many years. He was governing director of Millwards Merchandise, Ltd., with whom he had been connected for 55 years, and was a founder and first chairman of the Chemical and Dyestuffs Traders' Association.

Use of the Term "Fadeless"

The Finishing and Allied Trades Section (of which Mr. J. H. S. Lawson is chairman) records that at the request of one of the members of the Chamber, consideration was given to a decision made on the part of the Retail Trading Standards Association, to study the question of the use of the term "fadeless." At a meeting convened by the Association, at which various finishing processes associations were represented, it had been generally agreed that the term "fadeless" was now being abused. A working sub-committee of the Association was appointed to investigate all the details surrounding this problem.

The committee decided in view of this, that all constituent organisations represented on the committee should be asked to consider the matter as originally raised by the member of the Chamber. At the time of writing the report, the sub-committee of the Standards Association had not yet made its report, and all the views of the finishing organisations represented on the committee had not yet been collated. The committee will continue to watch the situation closely in order to ensure that in the course of action pursued by the retailers, the interests of the finishers will not be impaired.

The Retail Trading Standards Association had under consideration, during the year, the definition of the term "Indigo." In the course of their inquiries, they asked the executive committee for a pronouncement of their views on this question. During a discussion on the points raised by the Association, it became obvious that as the term had an entirely different interpretation in the yarn dyeing and piece goods dyeing trades, it would be impossible for unanimity to be reached. The committee therefore decided that the Standards Association should be supplied with a list of the organisations represented on the committee, in order that they might obtain the individual view of each of those organisations.

Brighter Prospects for Export Trade

Federation of British Industries Forecast

THE business forecast for the first quarter of 1937 issued by the Federation of British Industries this week indicates that the recovery in home trade seems to be approaching a peak. Whether, however, the point of maximum activity will be reached this year or next year, it is too early to judge. Rearmament policy, the Coronation and the volume of public and semi-public work set in train during the coming year will be the determining factors.

The prospects for export trade on the other hand are brighter than they have been for some time. The continuing rise in prices of important primary commodities should increase the purchasing power of many overseas countries and provide them with the much-needed funds for liquidating past debts and relaxing exchange restrictions. Coal, textiles and shipbuilding in particular should benefit, but certain other industries, especially those in the non-ferrous metal and constructional categories may find it less easy to participate owing to the heavy pressure of orders on home account.

Sir Henry Wellcome's Estate

Trustees' Statement

SIR HENRY H. DALE, Professor T. R. Elliott, Mr. G. Hudson Lyall, Mr. L. C. Bullock and Mr. Martin Price, trustees of the will of the late Sir Henry Wellcome, issued a statement last Saturday to clear up any misconception which may have arisen with regard to the effects of the will. They have received a number of appeals for contributions to various research undertakings, which they will not be able to consider in the immediate future.

In January, 1924, the Wellcome Foundation, Ltd., was formed for the purpose of taking over the whole of the business activities of Burroughs Wellcome and Co., and the various scientific research institutions and museums established by the late Sir Henry Wellcome, who held the whole of the share capital. By the terms of the will the shares of the Wellcome Foundation are now vested in the trustees and the activities of the foundation throughout the world will be carried on, in collaboration with the trustees, by a board of directors of which the present governing director is Mr. George E. Pearson, who has been closely associated with the late Sir Henry Wellcome for more than 40 years.

Maintenance of Charities

Owing to the magnitude of the estate a large sum has to be found for death duties. Provision has also to be made for: A welfare fund for the benefit of employees of the Wellcome Foundation, Ltd., and its associated companies; the payment of certain specified annuities to relatives and others personally connected with the testator; and the erection and maintenance of a building in Minnesota to be dedicated as a memorial to the testator's parents.

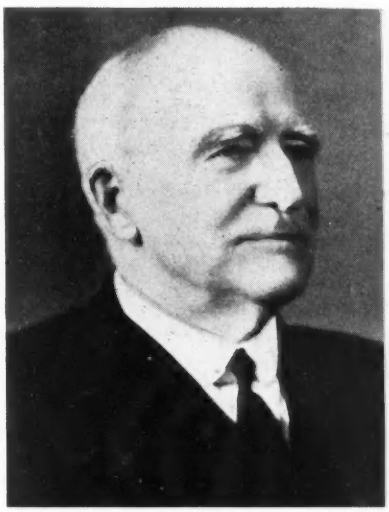
Subject to these prior charges the remainder of the divisible profits will be utilised in accordance with the testator's instructions in the following manner:—

(i) For the maintenance of "The Research Undertaking Charity," which is a fund for the advancement of medical and scientific research work in any part of the world conducive to the improvement of the physical conditions of mankind, and in particular for the discovery, invention, and improvement of medical agents and methods for the prevention and cure of disorders and the control or extermination of insect and other pests which afflict human beings and animal and plant life, and also for the organisation, equipment, and expense of special research expeditions and commissions.

(ii) For the maintenance of "The Museum and Library Charity," which is a fund for the establishment or endowment of research museums or libraries in any part of the world and for the collection of information of every kind connected with the history of medicine, surgery, chemistry, bacteriology, pharmacy, and allied sciences which in the opinion of the trustees may be desirable.

The Trustees' Covenant

Sir Henry Wellcome imposed upon all his trustees the obligation, before undertaking the trust, to enter into a covenant not to be engaged in or in any way to assist in any concern which carried on a business in competition with Burroughs Wellcome and Co. Three of the trustees had no difficulty in entering into this covenant immediately after the testator's death, but the two medical and scientific trustees felt that certain words in the covenant might be held to restrict them unduly in the performance of their official and general duties to medical science and to imply their particular concern with the business interests of the foundation. The matter has now been considered by the High Court of Justice, which has made an order allowing them to enter into a covenant in a form removing any such unacceptable implication and enabling effect to be given to what was known to have been the testator's intention.



The late Sir Henry Wellcome.

No trustee, director, or any other person holds for himself or in his own right any shares in the Wellcome Foundation and all the divisible profits in each year will be devoted to the various purposes named in the will and indicated above.

This is believed to be the first example, in this country at least, of a testamentary disposition by which the whole of the profits from a great manufacturing and trading organisation, after certain personal and memorial bequests have been fulfilled, are permanently dedicated to the advancement of knowledge for the general benefit of mankind.

"Current Science"

Special Numbers on Outstanding Discoveries

"CURRENT SCIENCE," published at Bangalore, the Indian counterpart of "Nature," has introduced the idea of publishing special numbers on the most outstanding scientific discoveries. We have received a copy of the first of the series, issued in January, devoted to "Laue's Diagrams," comprising a review of 25 years of research on X-ray diffraction following Professor Max von Laue's discovery. Sir William Bragg, Professor W. L. Bragg and eleven other well-known authors contribute special articles and the subject is ably introduced by Sir C. V. Raman.

In a covering letter, Professor C. R. Narayan Rao, the editor, gives us advance particulars of three other special numbers that are in contemplation, dealing with "Canal Rays," "Genetics" and "Organisers in Animal Development." Sir J. J. Thomson will write an introduction on the importance of Canal Rays for the first of these special numbers, and among the ten contributors will be Dr. S. D. Cockcroft. Professor E. B. Babcock will deal with "Phylogeny in the Light of Genetics and Cytology" in his introduction to the second number and Professor J. B. S. Haldane will be among the contributors. Dr. R. G. Harrison, Dr. P. Weiss and Dr. C. H. Waddington will be among the chief contributors to the special number on "Organisers in Animal Development."

IT was reported unofficially that the Sumitomo Chemical Industry, of Osaka, during September, 1936, increased its output of potassium carbonate from 20 metric tons daily to 50 tons at its enlarged plant at Niihama. In addition to technical grades the company is producing a grade suitable for use in pharmaceuticals. The Japan Sodium Co. has heretofore been the sole makers of potassium carbonate and keen competition is expected between the two concerns.

Structure of Silicates

Professor W. L. Bragg Talks about Minerals

LECTURING before the Leeds Section of the Chemical Society at Leeds University on January 28, Professor W. L. Bragg, of Manchester University, had some interesting observations to make on "Silicates."

Everybody, said Professor Bragg, ought to be interested in silicates because people lived on them, not as nutriment, but owing to the fact that they constituted the roof which made the solid outside of the world. Taking oxygen, silicon, aluminum, iron, calcium, potassium, sodium and magnesium as the elements composing the crust of the earth, oxygen accounted for 50 per cent. and silicon for 26 per cent.; these two, with the other elements, contributing 98 per cent. of the make-up of the earth's crust. Silicate structures could be built up and by this means it was possible to draw some generalisations about the structure of the solid earth. One particular feature was that the patterns which the atoms built up in the structure of silicates were subject to very simple rules, but obeyed them rigorously—the patterns were of delightful symmetry.

Silicon was always found between four oxygen atoms, but one silicon atom shared the oxygen with other neighbouring atoms and gave the formula $Si.O_3$. Aluminium was able to proxy for silicon and directly it entered into one of the structures in place of silicon it furnished an aluminium charge and the formula became $(Al.Si.)O_2$.

Composition of Earth's Crust

The relative proportions of the different minerals in the earth's crust, continued Professor Bragg, were felspar 60 per cent.; quartz 12 per cent., mica 4 per cent.; amphiboles and pyroxenes 17 per cent. and olivine. Quartz had a cage structure and so had felspar and the structure was linked everywhere corner to corner. In felspar, however, aluminium replaced some of the silicon, and potassium and the other elements balanced out the cage. Mica was a slab structure; and amphiboles and pyroxenes had chain structures. The amphibole and pyroxene group included asbestos, which was really a stone, but he had been successful in tying some of it into a knot. The extraordinary thing about mica was that it was strong in the sheets of which it was composed, but weak between the sheets—a feature which would be observed when the element was split. The three main formulæ in felspars were $K.Al.Si_3O_8$ (monoclinic); and $Ma.Al.Si_3O_8$ and $Ca.Al_2Si_2O_8$ (triclinics). All had the same structure and felspars never contained iron or magnesium. The reason why there was more felspar in the earth's crust was purely a geometrical consideration. When the tetrahedra were fitted together and one had to build up cages by linking every corner to another corner, it would be found that it was a space wasting procedure, because one oxygen point could not be shared by three silicons. The cage structure, therefore, was the most voluminous of all. Next came the micas, then the chain group (amphiboles and pyroxenes) and next the olivines. Roughly, the minerals came in the order in which they would float; the lighest being the most common. Felspar, for instance, had a density of 2.75-2.55, and olivine 3.4.

Replying to questions, Professor Bragg said the chances of a cleavage in a sheet structure—like mica—jumping a sheet were about fifty-fifty. If the sheets were all bending the same way, obviously the cleavage would run one way and would not jump a plane. He stressed the point that in considering density, geometry was of importance and not what was put in. Physicists looked rather askance at this kind of work, but it was one of the two big fundamental contributions to physics at the present time. There were two sorts of physicists—those who started outside and went inside, and those who stopped outside. They were not mere robots turning out models, but presented them to people, who, with all the knowledge they possessed on other subjects, could see the possible implications of the structures.

Inorganic Chemistry

Some Recent Progress

A MEETING of the Chemical Society was held jointly with the Swansea University Chemical Society in the Chemistry Lecture Theatre of the University on January 29. The lecturer was Dr. William Wardlaw, of Birmingham University, whose subject was "Recent Progress in Inorganic Chemistry." Mr. P. G. Morris, of the Swansea University Research Department, presided.

Dr. Wardlaw prefaced his lecture with the observation that their knowledge was still very limited of certain chemical elements. One of these was carbon. Most of them knew that carbon could occur in a number of forms, but the fact that it could occur in a form known as C_2 was not so well known. This was known as di-carbon and it was made in a very simple way. In 1926 a well-known research chemist isolated a carbon oxide known as C_3O_2, and when this was carefully heated it broke up into carbon di-oxide and a reddish-colour gas which was soluble in water, and when examined spectroscopically gave a band clearly of the C_2 unit and there was no doubt that it was an anotropic form of carbon. There was every reason to believe that C_2 did exist. A warning was needed against use of the word "amorphous" when applied to carbon. There were no amorphous carbons, for recent investigations had shown clearly that even in the finest carbons they had a crystallite substance of the graphite formation.

An element about which they still knew very little indeed was phosphorus. What did they know about it? Even when they were lecturing on it they were not quite sure whether they were speaking the truth when they said that there was a white modification and a red modification. There was no doubt that a white phosphorus did exist, which was soluble in CS_2 and gave a molecular weight of 124. They also know that if they took a white phosphorus, heated it, exposed it to sunlight and put the X-ray on it they had the substance changed to a modification which was known as red phosphorus. There was also a third form known as black phosphorus, which was prepared by Bridgeman in 1914, and which had a density of from 2.6-2.7 as compared with the 2.34 of red phosphorus.

Chemical Reactions at Low Pressure

Quite recently a number of investigators had been conducting a series of interesting experiments by studying chemical reactions at low pressure. About three years ago P. W. Schenk passed a discharge of SO_2 and sulphur through vapour form at very low pressure and produced a substance known as sulphur monoxide. That knowledge was used to repeat the observation which had been made in 1883 on the oxidisation of sulphur and by the aid of which Schenk had been able to isolate sulphur monoxide under very low pressure.

Dr. Wardlaw explained in detail what he described as "an industrial process which represented the progress of chemistry in industry." This was the changing of SO_2 into sulphur. It was quite an easy process to turn sulphur into SO_2, but it was difficult to turn SO_2 into sulphur. In some countries the sulphur dioxide was simply passed into the air, creating pollution of atmosphere and an annual loss which was estimated to be about ten million sterling. Having regard to these facts chemists had evolved a process which he (the lecturer) had the privilege of seeing in the early stages. It involved the passing of the SO_2 over red hot coke, and this produced CO_2 and sulphur. One of their greatest difficulties was to get a solvent for the SO_2. The gases coming off contained anything from 3 to 7 per cent. of SO_2 so that it was necessary to have a concentrator and this had been accomplished by means of a basic aluminium salt, liberating pure SO_2 gas.

Another interesting process which Dr. Wardlaw described was the manufacture of concentrated H_2SO_4, whilst he dealt in conclusion with the structure if the carbides and their interesting association with the rarer element of thorium.

Dr. Hartshorn proposed a vote of thanks to Dr. Wardlaw which was seconded by Dr. J. E. Coates.

Notes and Reports from the Societies

British Association of Chemists

Conversazione at Manchester

THE Manchester Section of the British Association of Chemists held a conversazione at the Engineers Club, Manchester, on January 30, at which the members and their friends spent an enjoyable evening of an entirely informal character. The proceedings commenced with a concert. The musical items were rendered by a quartette, the artists being Dr. Reid, Dr. Salkeld, Mr. Maddocks, and Mr. Roscoe. Miss McGookin also sang. Dr. Bartlett rendered a pianoforte solo, and also accompanied the singers. The concert was organised by Mr. Amos Gill.

After an interval for refreshments, the remainder of the evening was devoted to dancing and cards, Dr. Anderson officiating as M.C. About 120 members and friends were present.

Pharmaceutical Society

The Addendum to the British Pharmacopoeia

THE fourth evening meeting of the Pharmaceutical Society in the 1936-37 series will be held in the Society's House next Tuesday at 8.30 p.m. A lecture on "The Addendum 1936 to the British Pharmacopœia 1932" will be given by Mr. C. H. Hampshire, secretary to the Pharmacopœia Commission.

The Addendum became official on December 29, and now has the same authority as the British Pharmacopœia, 1932. In it twenty-nine new official substances are described including antitoxins and sera, organic arsenical compounds, vitamins and other drugs which have come into use in recent years. The Addendum contains also sections by which ninety-three monographs of the British Pharmacopœia, 1932, are amended in important particulars; the monographs on acriflavine, sterilised water and physiological solution of sodium chloride have been completely revised and significant alterations have been made in the other monographs. These changes have an important bearing on the work of pharmacists.

Institute of Chemistry

January Examination Results

THE Institute of Chemistry has issued the following pass list in respect of its January examinations:—

Examination in General Chemistry for the Associateship.—G. Barnett, Central Technical College, Birmingham; C. Bayne, Heriot-Watt College, Edinburgh; N. S. J. Bebington, City Technical College, Liverpool; W. M. Dowson, B.Sc. (Lond), University College, Nottingham; R. A. Dunford, Merchant Venturers' Technical College, Bristol; and The Polytechnic, Regent Street; E. F. Eaton, City Technical College, Liverpool, and Sir John Cass Technical Institute; S. Fry, Central Technical College, Birmingham; R. F. J. Gross, B.Sc. (Lond.), University College, London; W. Holburn, Municipal Technical College, Halifax; K. R. Honick, Central Technical College, Birmingham; J. S. Ingham, B.Sc. (Lond.), King's College, London; G. F. J. Mansell, City Technical College, Liverpool; A. H. McKeag, B.Sc. (Lond.), Sir John Cass Technical Institute; J. S. Melvin, Royal Technical College, Glasgow; A. S. Pay, Sir John Cass Technical Institute; R. E. Peel, City Technical College, Liverpool; F. H. Pleydell, B.Sc. (Lond.), The Polytechnic, Regent Street; N. F. Proudfoot, City Technical College, Liverpool; W. E. L. Taylor, Municipal Technical College, Hull; G. Tracey, Municipal Technical College, Blackburn; F. S. Wilkins, Central Technical College, Birmingham; A. C. Wilson, Royal Technical College, Glasgow; C. H. Wood, City Technical College, Liverpool; D. E. Wright, Sir John Cass Technical Institute.

Society of Chemical Industry

Road and Building Materials Group

MR. J. M. COLLIE, assistant City Engineer of Sheffield, will read a paper on "Road Plant" at a meeting of the Road and Building Materials Group of the Society of Chemical Industry at Burlington House, London, at 8 p.m. next Tuesday. The author deals only with plant concerned with construction and treatment of road surfaces. He uses the experience of the last ten years to demonstrate the necessity for strict control, attention to detail and the expert assistance of the chemist and the application by the engineer of his research. When these factors are properly employed in conjunction with up-to-date road plant, roads suitable to modern conditions may be expected.

Mr. Collie's paper is likely to excite comparison with practice in other areas and a helpful discussion is anticipated.

Institution of the Rubber Industry

Manchester Section's Annual Dinner

ABOUT 260 members and friends attended the annual dinner and dance of the Manchester Section of the Institution of the Rubber Industry, held at "The Manchester" Ltd. Restaurant, on January 29. Mr. E. P. Rydings, chairman of the section, presided over the proceedings. Mr. R. B. Clarke and Mr. N. Dixon fulfilled the duties of M.C., while Drs. L. R. Ridgeway and W. J. S. Naunton, and Messrs. E. H. Hurlston, W. N. Lister and T. Martin officiated as stewards, assisted by Mr. Maldwyn Jones, hon. secretary of the section.

As is becoming the general custom at such gatherings the toast list was very short, consisting merely of two items; the loyal toast, proposed by the chairman, and "Our Guests," also proposed by the chairman and responded to by Mr. A. McCulloch, chairman of the local section of the Society of Chemical Industry.

The evening was an enjoyable one and amply fulfilled the purpose which the promoters intended—to bring about closer social association and friendship between the members and friends.

Electrodepositors' Technical Society

Bright Nickel Plating

A MEETING of the Electrodepositors' Technical Society will be held at the Northampton Polytechnic Institute, St. John Street, London, next Wednesday at 8.15 p.m., when a symposium on "Bright Nickel Plating" will be held. The electrodeposition of lustrous or bright metals is not a recent innovation, since the effect which is usually brought about by adding certain "addition agents" of a colloidal character to the electrolyte has long been observed. It is only, however, very recently that dependable electrolytes have been produced which result in a bright deposit and which may be continuously applied on polished surfaces eliminating either wholly or partially this subsequent finishing or "colouring" operation. Considerable activity in this connection has centred round the deposition of nickel. The possibility of directly chromium plating after nickel plating and eliminating the intermediate polishing operation is one which is of considerable importance to the electroplating industry.

The object of the symposium is to discuss the recent development in this field of work from the historic, technical, industrial and economic points of view. A number of short contributions will be made by workers in this field, who will open the discussion, which will be thrown open to the meeting. Mr. W. T. Griffiths will occupy the chair.

Testing by Fluorescence

A Rapid Method of Wide Application

A HANDY 16 page brochure entitled "Fluorescence for Rapid Testing" has just been issued by Hanovia, Ltd., the ultra-violet equipment manufacturers. In its sub-title the booklet is described as "a brief outline of uses and methods for fluorescence tests with the analytic lamp in industry, research, police work, the fine arts, etc." Chemical applications of fluorescence which are dealt with include foodstuffs, drugs and fine chemicals, silicates, tanning and paper manufacture, textiles, colours and varnishes, rubber, and fuel oils. The brochure also gives some very useful notes on the technique of fluorescence analysis and photography.

Two typical examples of the value of fluorescence testing deserve to be mentioned. Solvent extracted olive oils generally show a violet fluorescence, whereas pressed oils have a yellow or characteristic fluorescence under the lamp. The ultra violet rays also give good indications of heat treatment and deterioration due to light. According to some workers, as little as 1 per cent. of refined olive oil in virgin oil may be detected by the change of fluorescence colour of the latter; 10 per cent. of soya bean oil, bean, maize, and grape seed oils added to virgin olive oil also alter the fluorescence. Wimmer and Goodman have found the lamp of value in the testing of essential oils and other constituents used in perfumery and cosmetics. Müller, and also Ekman, give the fluorescence of a large number of these compounds. A specific test for sesame oil, sensitive to the presence of 1 per cent. of the oil, has been evolved by Pavolini. Irradiation of soaps with unfiltered rays give a good indication of the keeping quality, a rancid smell and a brown colour being developed by those which deteriorate on storage.

Whilst those who make extensive use of fluorescence for routine tests or research will necessarily require one of the standard text books, such as that by Radley and Grant, any one wishing to gain an outline of the subject will find this brochure very useful. A copy may be obtained free, on application to Hanovia, Ltd., Slough.

Ions and Isotopes

A Dispute Between Chemists and Physicists

SPEAKING on the subjects of "Ions and Isotopes," at a meeting of the Royal Society of Edinburgh, on February 1, Professor James Kendall, F.R.S., said that it was for a long time a matter of dispute between chemists and physicists whether the mobility of an ion (the speed with which it migrates through the solution towards the electrode under the influence of the electric current) was dependent upon its volume or upon its mass. No decision was possible until the existence of isotopes (ions of the same element, with identical volumes but different masses) was established.

Apparatus was devised in which a short section of a solution containing a mixture of isotopic ions was run for a considerable distance along a series of tubes, with the idea that if mass were the significant factor affecting mobility, the faster species would, at the end of the run, all be in the front of the section, and the slower species all at the rear, and a quantitative separation of natural isotopes, hitherto unattainable, would thus be achieved. The results were entirely negative, and it therefore appeared that volume was the significant factor in ionic mobility. By means of similar experiments with synthetic mixtures containing two distinct ions of slightly different mobilities, however, it was found that many important separations, most difficult to make by standard methods such as fractional crystallisation, could be very readily effected. Mixtures of the rare earth elements, praseodymium and neodymium, for example, from which the two components are obtainable in a pure state only after many hundreds of fractional crystallisations, were separable within a few days. It was shown that the method could also be successfully used in the separation of radium from barium residues. It might also be applicable in resolving mixtures of naturally occurring alkaloids.

Another method by which the separation of isotopes was attempted was that of fractional electrolysis, and in 1923 a slight fractionation of mercury was achieved thereby. In the expectation that more conclusive results would be obtained with a lighter element than mercury, a systematic study of this method was begun in Edinburgh in 1930. A large amount of work had already been done on lithium, where the discovery of the isotopic character of hydrogen directed attention to that element, which obviously offered still greater chances of success. Spectrographic evidence that the proportion of "heavy hydrogen" in the first fractions of the electrolysis of water was less than in ordinary hydrogen had been obtained, when investigators in America announced the isolation of pure "heavy hydrogen" from the final fractions of the electrolysis. This must be regarded as one of the most important discoveries in chemistry in recent years. Professor Kendall said that it was disappointing to have been anticipated, but there was some consolation available in being the first to employ the method by which the separation was made.

Presentation of Perkin Medal

From Periodic Table to Production

THE Perkin Medal for 1937 was presented on January 8 to Mr. Thomas Midgley, jun., of the Ethyl Gasoline Corporation at a joint meeting of the American Section of the Society of Chemical Industry and the American Chemical Society, held at the Chemists' Club, New York City. Mr. James G. Vail, chairman, presided. The programme included a talk by Mr. Robert E. Wilson on the acccomplishments of the medallist, presentation of the medal by Dr. Marston T. Bogert and delivery of the medal address by the recipient.

Mr. Midgley discussed the use of the periodic table in the research which led to the development of antiknock gasoline and organic fluoride refrigerants. His paper was entitled "From the Periodic Table to Production." In the case of the antiknock gasoline the Edisonian method was first used to discover a material which would provide antiknock properties. This having given preliminary results, the property was traced through the periodic table to discover in which element it would become maximum. After years of research the prediction that tetraethyl lead would be satisfactory was borne out as evidenced by the widespread use of this material in antiknock gasoline.

In the case of the development of a non-toxic, non-inflammable refrigerant, the work took only three days. The International Critical Tables proving to be of little help, the periodic table was again used. The investigation went through fluorine to fluorine-carbon compounds and finally to the now commercially important organic fluoride refrigerants.

In accepting the medal as recognition of his work, Mr. Midgley gave credit to Mr. C. F. Kettering, Mr. T. A. Boyd and Mr. Carroll A. Hochwalt for their assistance in the development of tetraethyl lead, and to Mr. Albert L. Henne for his aid in the development of the organic fluoride refrigerants.

Mr. Midgley is vice-president of Ethyl Gasoline Corporation and of Kinetic Chemicals Inc. His most important work has been the discovery of antiknock compounds for use in gasoline, leading to the development of ethyl gasoline, and the application of non-toxic organic fluorides to refrigeration. Mr. Midgley is a member of the American Chemical Society, of which he was chairman of the board of directors in 1934, the American Institute of Chemical Engineers, the Society of Automotive Engineers, Society of Military Engineers, American Public Health Association, Association of Cornell Engineers, Sigma Psi, Phi Kappa Phi and Atmos. He is a fellow of the American Association for the Advancement of Science. He received the Nichols Medal in 1923 and the Longstreth Medal in 1925. He has published many articles and has had many patents in his name or jointly with others.

Personal Notes

MR. J. W. NAPIER, chairman of the Glasgow section of the Society of Chemical Industry, and a member of council of the Institution of Chemical Engineers, has been presented with his portrait in oils on the occasion of his retirement from his posts in connection with the Scottish national gas organisations. The presentation was made at a complimentary luncheon at Edinburgh. In handing over the portrait Sir William Whyte referred to the fact that a Scottish Gas Council had existed prior to the formation of the National Gas Council, and said Mr. Napier had taken an active part in setting up the Scottish body and in its subsequent association with the national body. Mr. Napier had been honoured by his professional brethren in the industry by having occupied the position of chairman of the Scottish Gas Managers, president of the North British Association of Gas Managers, and president of the Waverley Association of Gas Managers, an unusual record. One of the stalwarts of a great public service, Mr. Napier had just completed forty years as a gas engineer and manager. In a brief reply Mr. Napier said that the name of Napier had been connected with the industry for sixty years, and he hoped that it would continue to be so for many years to come. Tributes to Mr. Napier's work were paid by Mr. W. Milne, Aberdeen, and Mr. W. J. Smith, secretary of the National Gas Council.

Mr. J. W. Napier

MR. W. S. WALKER has been appointed demonstrator in chemical technology in the Faculty of Technology at the University of Manchester.

MR. J. H. STEWART has been appointed a director of Goodlass Wall and Lead Industries, Ltd.

PROFESSOR W. G. CADY, of the Wesleyan University, Middletown, Connecticut, has been awarded the fourteenth Duddell Medal of the Physical Society.

PROFESSOR DE HAAS, of Leyden University, has been appointed Scott Lecturer at the University of Cambridge for the academical year 1937-38, according to an announcement of the Faculty Board of Physics and Chemistry.

PROFESSOR W. L. BRAGG, M.A., Sc.D. F.R.S., professor of physics at Manchester University, has been appointed a Pro-Vice-Chancellor for a period of two years in succession to Professor A. H. Gibson.

MR. A. E. TULIP is leaving the Billingham works of Imperiol Chemical Industries, Ltd., to take up a post with the Castner-Kellner Alkali Works, Runcorn. He has been the recipient of a presentation by Mr. W. C. Lyall, general manager of the works.

MR. L. P. O'BRIEN, director and commercial manager of B. Laporte, Ltd., was elected president of the Luton Chamber of Commerce at the annual meeting of the Chamber on January 28. Mr. O'Brien is a member of the council of the Association of British Chemical Manufacturers.

MR. JOSHUA ALFRED DAVY, general manager of Benzol and By-Products, Ltd., has died. Mr. Davy was born at Middlesbrough 64 years ago and started his career with Dorman Long and Co., Ltd. Afterwards he joined the firm of E. R. Samuelson, Middlesbrough, later going to the Higgenstock Coke Oven Co., Leeds.

MR. HUGH SMITH, of Milngavie, a director of Robert Ingham, Clark and Co. (Scotland), Ltd., paint manufacturers, Renfrew, died suddenly last week-end. He started his business career in Glasgow over 50 years ago, and early in 1905 became a partner in the paint-making firm of Dowie and Smith, which firm was amalgamated with Robert Ingham Clark in 1922, when Mr. Smith became a director.

Chemical Notes from Foreign Sources

Turkey

EXTENSIONS TO THE IZMIR PAPER WORKS are now in progress, which will double the present annual capacity of 12,000 tons of paper.

Austria

THE CHEMICAL PRODUCTS CO., of Vienna, is insolvent for six or seven times its nominal capital of 100,000 Austrian shillings (about £3,800).

Bulgaria

TENDERS FOR ERECTING A SULPHUR ACID WORKS have been invited by the Government, who are aiming at eliminating imports of this material.

Palestine

A WIDE RANGE OF FERTILISERS is to be produced at a factory shortly to be erected at Haifa.

A STARCH FACTORY USING RICE AS RAW MATERIAL is under construction at Kfar-Saba, in the vicinity of Tel-Aviv.

Norway

A CONTRACT FOR THE SUPPLY OF SULPHITE SPIRIT has been concluded between the Borregard Co., who own the largest cellulose factory in Norway, and the State Alcohol Monopoly. The sulphite liquors from which alcohol will be produced were formerly run into the sea.

Italy

A NEW OIL REFINERY, with a daily capacity of 1,200 tons, the largest in the Mediterranean area, was recently put into operation at Zaule, near Trieste, by the Aquila Co.

Finland

HYDROGEN PEROXIDE MANUFACTURE on a scale of 200 tons per annum is being started by A. B. Voikoski, who are already producing oxygen and hydrogen. The ammonium persulphate process will be used.

Jugoslavia

TENDERS ARE INVITED (up to February 15) for the supply of 1,000 tons ammonium nitrate for the State Gunpowder factory at Kamnik, from whom full particulars can be obtained at a cost of 40 dinars.

Japan

MANUFACTURE OF CARBON BLACK FROM ACETYLENE is to be undertaken by the Electrochemical Industry Co., of Tokio.

THE OUTPUT CAPACITY OF LITHOPONE frome the Mike refinery, belonging to the Mitsui concern, has been increased to 100 tons per month.

A SULPHURIC ACID FACTORY using the contact process for a daily capacity of 50 tons is being constructed at Otake (province of Hiroshime) by the Shinko Jinken K.K.

Sweden

AN OIL REFINERY, with a daily capacity of 1,500 gallons, recently commenced operation at Västeras. The plant will be used mainly for recovery of waste oil.

WATER GLASS IS TO BE PRODUCED in the country for the first time by the newly-formed A/B Vettrafabrikerna, of Humar, using quartz deposits in the vicinity of the works as raw material. Over 8 million lb. of water glass were imported in 1935 principally from France and Germany and the new works is aiming at complete elimination of imports.

Germany

PRODUCTION OF BENZINE AND DIESEL OIL from lignite by high pressure hydrogenation is to be undertaken in the Rhineland by the newly-formed Union Rhenische Braunkohlen und Kraftstoff A.G., of Cologne (share capital 45 million marks).

NEW COMPANY REGISTRATIONS include:—Süddeutsche Pektin G.m.b.H., Heilbronn (capital 80,000 marks), manufacturers and dealers in pectins and their raw materials; Dr. Walter Jung and Co., G.m.b.H., Berlin (capital 20,000 marks), production and sale of pharmaceutical preparations.

References to Current Literature

British

ANALYSIS.—The turbidimetric titration of gelatin solutions. J. F. Morse, *Analyst, 62,* 11-18.

Rapid method for the determination of antimony in lead-rich alloys. K. Stanford and D. C. M. Adamson, *Analyst, 62,* 23-28.

A new apparatus and method for determining the water absorption capacity of leather. V. Kubelka and Vl. Nemec. *J. Intern. Soc. Leather Trades Chem., 21,* 9-12.

SOAP.—Modern developments in soap-making. III Toilet Soaps. W. H. Simmons, *Manufacturing Perfumer, 1,* 122-126.

CELLULOSE.—Production of pulp mechanically defibred. The design and results of the double disc refiner. A. S. Cosler, *Pulp and Paper Magazine of Canada, 37,* 750-752.

OIL.—Criteria of Diesel fuels, their relative importance. L. J. Le Mesurier, *Petroleum Times, 37,* 85-87.

Oil for metal melting. Economical melting furnaces of high output. A. J. Gibbs Smith, *Petroleum Times, 37,* 111-112.

METALS.—Production and properties of copper. R. D. Burn, *Metal Industry, 50,* 153-160.

TEXTILES.—The properties and uses of enzyme preparations. Malt and pancreatic diastases in sizing and desizing: Papain and an "activator" for degumming silk mixtures. *Dyer and Textile Printer, 77,* 74-75.

The treatment of rayon and cellulose acetate silk. Special finishes for rayon. Reproducing the scroop of natural silk. Internal delustring by titanium dioxide. R. Mitcheson, *Dyer and Textile Printer, 77,* 97-99.

PIGMENTS.—Black pigments. F. R. Jones and C. R. Watts, *Oil and Colour Trades J., 91,* 341-346.

MISCELLANEOUS.—Zinc oxides. L. McNaughton, *Oil and Colour Trades J., 91,* 274-276.

The corrosion of nickel anodes. Effects of composition and structure. A. Gordon Spencer, *Metal Industry, 50,* 141-144.

Hormones. R. G. Harry, *Manufacturing Chemist, 8,* 11-15.

Matches II. T. A. Watson, *Manufacturing Chemist, 8,* 23-25.

American

LEATHER.—The action of micro-organisms on vegetable tanning materials. Characteristics of the acetic acid fermentation. W. P. Doelger, *J. Amer. Leather Chem. Assoc., 31,* 531-544.

RUBBER.—Organic accelerators important in the development of rubber technology. E. A. Van Valkenburgh, *India Rubber World, 95,* 51-55.

SOAP.—Polished soap flakes. J. M. Vallance, *Soap, 13,* 25-28 and 37.

PAINT.—Silicic acid esters as vehicles for lacquer pigments. W. Graulich, *Paint and Varnish Production Manager, 16,* 24H.

RESINS.—Does alkali resistance mean durability? C. T. O'Connor, *Paint Oil and Chemical Review, 99,* 9-10.

OIL.—Viscosity conversion charts use temperature relations. R. Grosholtz, *National Petroleum News, 29,* 151-156.

The unitary thermal polymerisation process. J. S. Carey, *Refiner and Natural Gasoline Manufacturer, 15,* 549-554.

METALS.—Some consequences of graphitic corrosion of cast iron. W. A. Wesley, H. R. Copson and F. L. Laque, *Metals and Alloys, 7,* 325-329.

TEXTILES.—The unwanted yellow tone in white woollens. An account of some experiments to discover the cause and remedy. A. J. Hall, *Amer. Dyestuff Reporter, 26,* 1-3.

MISCELLANEOUS.—Disinfectants and antiseptics. E. Klarmann, *Soap, 13,* 104-108.

Pipe corrosion and coatings. E. Larson, *American Gas Journal, 146,* 29-52 and 62.

Corrosion of tubing in the oil industry. N. W. Mitchell, *Refiner and Natural Gasoline Manufacturer, 15,* 559-563.

German

HYDROCARBONS.—A new process for the treatment of technical hydrocarbons, especially for obtaining a practically complete drying by means of solid and dissolved caustic alkalies. H. Kiemstedt, *Brennstoff-Chemie, 18,* 23-24.

METALS.—The influence of steam on easily melted metals and alloys in relation to the temperature. R. Kleinert, *Metall und Erz, 34,* 30-32.

EMULSIONS.—Apparatus for the technical preparation of modern pharmaceutical-chemical emulsions. P. Martin, *Die Pharmazeutische Industrie,* 1937, 3-8.

DYEING.—The reception and rejection of dyestuffs by straw. A. Lottermoser and P. Neubert, *Kolloid-Beihefte, 45,* 149-209.

COLLOIDS.—Ascorbic acid and isoascorbic acid as reducing agents in the preparation of colloidal solutions of gold, palladium, platinum, silver, selenium, tellurium, molybdenum blue and tungsten blue. H. Brintzinger, *Kolloid-Z., 78,* 22-23.

MISCELLANEOUS.—Benzene recovery by steam distillation. O. Krebs, *Teer und Bitumen, 34,* 418-419, 429-431

Creosote for the impregnation of wood. F. Moll, *Oel und Kohle, 13,* 77-79.

The taking up of phenols and phenol carbonylic acids by cellulose. K. Brass and O. Gronych, *Kolloid-Z., 78,* 51-68.

The thermal decomposition of ammonium permutite, ammonium bentonite and ammonium clay. O. Bottini, *Kolloid-Z., 78,* 68-71.

French

GAS.—A new liquid purification process for gas. M. G. Léonet, *Bulletin de L'Association des Gaziers Belges, 58,* 297-319.

METALLURGY.—Contribution to the study of the part played by nitrogen in welding. A. Portevin and D. Séférian, *Revue Metallurgie, 33,* 705-720.

ANALYSIS.—On the estimation of small quantities of manganese in biological products. P. Cheramy and A. Lemos, *J. Pharm. Chim., 25,* 17-20.

Peerage for Sir Harry McGowan

New Year Honours

SIR HARRY DUNCAN McGOWAN, K.B.E., LL.D., chairman and managing director of Imperial Chemical Industries, Ltd., became a member of the peerage on Monday, when his name appeared among the three new baronies announced in the first New Year Honours List issued by His Majesty King George VI. Sir Harry is 62 years of age and has spent 47 years in the service of industry. Born at Glasgow in 1874 he left school at the age of 15 to become office boy on the staff of Nobel's Explosives Co. Twenty-six years later he was elected to the board of the company and in 1918 he became its managing director. Later the same year there took place, largely due to his efforts, the amalgamation of British explosives and allied interests known as Nobel Industries, Ltd. At the early age of 44 Sir Harry became first chairman of the company.

After a few energetic years spent in consolidating the position of the company at home and overseas he came, in 1925, into touch with the late Lord Melchett, and as a result Imperial Chemical Industries, Ltd., was formed in 1926, with Lord Melchett as chairman and Sir Harry McGowan as president and deputy-chairman. Four years later, on the death of Lord Melchett, Sir Harry was elected chairman and managing director. As a recognition of his services during the war period Sir Harry was created a K.B.E. in 1918.

Sir Harry Duncan McGowan.

Sir Harry McGowan presides over the destiny of some 50,000 people in the United Kingdom alone. His company is divided into eight manufacturing groups, each of which is as large as, if not larger than the average big modern industrial unit, and this home organisation is only the hub of the far-flung organisation overseas, with manufacturing or selling companies in almost every market of the world.

In 1931 he was president of the Society of Chemical Industry on the occasion of its jubilee celebrations, and in 1934 he was the recipient of the Society's Messel Medal. On that occasion he delivered an address which covered varied aspects of research work and put forward many thought-stimulating suggestions. His contributions to the industry to which he has devoted his life received recognition when the Universities of Glasgow and Birmingham conferred upon him their respective degrees of LL.D. In 1934 he was elected president of the Institute of Fuel.

MR. HENRY THOMAS TIZARD, C.B., Rector of the Imperial College of Science and Technology, also figured in the New Year Honours list as the recipient of the K.C.B.

SIR WILLIAM CLARE LEES, O.B.E., managing director of the Bleachers' Association, received a baronetcy in recognition of his services to the British cotton and artificial silk industries.

Wetting and Detergency

Symposium on Scientific and Technical Aspects

A SYMPOSIUM, organised by the International Society of Leather Trades' Chemists (British Section), will be held in the Mathematics Lecture Theatre, Huxley Building, Imperial College of Science and Technology, London, on February 19 (10 a.m. to 6 p.m.) and February 20 (10 a.m. to 1 p.m.), the subject being "Scientific and Technical Aspects of Wetting and Detergency." The provisional programme is given below.

Part I. Friday morning, 10 a.m. to 1 p.m. Chairman, Professor F. G. Donnan, F.R.S. Professor H. Freundlich, "Flotation"; Professor A. Ferguson, "Some Problems of Wetting"; Dr. S. H. Bell, Dr. J. O. Cutter, and Mr. C. W. Price, "The Bartell Cell Technique"; Dr. H. K. Dean, "The Chemistry of Wetting-Out Agents"; Dr. C. G. Sumner, "Apparatus for the Measurement of Contact Angles by the Plate Method"; Dr. N. K. Adam, "Determination of Contact Angles on Thin Wires or Single Textile Fibres"; Mr. A. de Waele, "Wetting and Deflocculation."

Part II. Friday afternoon, 2.30 to 6 p.m. Chairman, Dr. W. Clayton. Dr. R. S. Edwards, "The Waterproofness of Vegetable Tanned Leather"; Mr. D. J. Macnaughtan, "The Wetting of Metals by Metals with Special Reference to Solders"; Dr. R. H. Marriott, "The Wetting of Skin, Hides and Leather"; Mr. W. E. Wornum, "Wetting as a Factor in the Application of Paints and Varnishes"; Mr. G. A. Campbell, "The Wetting of Pigments"; Dr. H. Martin, Detergents and Wetting-Out Agents as Assistants in Plant Pest Control."

Part III. Saturday morning, 10 a.m. to 1 p.m. Chairman, Dr. R. H. Marriott. Dr. Conmar Robinson, "The Mechanism of Detergent Action"; Dr. G. S. Hartley, "The Solvent Action of Detergent Solutions"; Mr. C. B. Brown and Mr. H. B. Oakley, "Some Aspects of the Action of the Newer Detergents"; Dr. H. Phillips, "Detergent Problems of the Woollen and Worsted Industries"; Dr. J. Powney, "The Penetration of Fabrics by Detergent Solutions"; Mr. E. K. Rideal, "Some Factors in Detergency."

On February 19 an informal dinner and entertainment will be held at the Chantecler Restaurant, Frith Street, Soho. The charge for this will be 6s. 6d. exclusive of wines (morning dress).

DR. HAROLD MOORE and Mr. W. Murray Morrison have been elected Fellows of the Institute of Metals. Dr. Moore is a past president of the Institute and is the present director of the British Non-Ferrous Metals Research Association. Mr. Morrison is one of the original members of the Institute, having assisted at its formation in 1908. For over forty years he has been associated with the British Aluminium Co., Ltd., and is now the vice-chairman and managing director of that company.

From Week to Week

BRYANT AND MAY, LTD., match manufacturers, Glasgow, have decided to grant their 160 employees three days holidays with pay in celebration of the Coronation. The firm normally works a five-day week.

THE IRISH FREE STATE GOVERNMENT announces that the existing duty on sodium carbonate imported in crystalline form is replaced by a duty on "sodium carbonate other than sodium carbonate imported in powder form." The rate of duty remains unchanged.

INTERNATIONAL COMBUSTION, LTD., who are makers of crushing and grinding plant which has been installed at large chemical works in this country and abroad, have produced a film to illustrate the resources of their works at Derby and the types of equipment which are manufactured there.

TWO OF THE PRINCIPAL LECTURES to be delivered during the Spring Term at the Nottingham University College will be the Abbott Memorial Lecture by Mr. S. G. Clift, on "Oil Finding in England and Elsewhere," and Professor J. Masson Gulland's inaugural Sir Jesse Boot Foundation Lecture on "Where Chemistry and Biology Meet."

THE BRITISH ALUMINIUM CO., LTD., announces an extension (through its subsidiary companies, the Lochaber Power Co. and the North British Aluminium Co., Ltd.) of its productive capacity at the Lochaber works, near Fort William, Inverness-shire. This will be secured by the utilisation of the reserves of water made available by the construction of the second stage of the Lochaber power scheme.

PATTERNS OF DEEP AND LIGHT "Glamis Red" have been issued in anticipation of the Coronation by S. Hubbard, Ltd., and Oakley and Jennings, of Luton. Christened by the Duchess of York at the British Industries Fair in 1933, this "brave red" has a special appeal in the spring of the year that will see Her Royal Highness crowned Queen Elizabeth. The deep "Glamis Red" closely resembles the ancient Tartan scarlet, while light "Glamis Red" is similar to the red lion rampant which appears on the Scottish Standard.

THE BRITISH NON-FERROUS METALS RESEARCH ASSOCIATION, with the aid of the Swedenborg Society, is to publish an English edition of Swedenborg's "Treatise on Copper." An existing manuscript written in English is being used as the basis of the text. According to Mr. B. Fullman, who is preparing the treatise for publication, its introduction to a wider circle of readers will show that Swedenborg had a very good personal knowledge of metallurgical methods as employed in England and that he was in touch with advanced developments for the smelting, refining, alloying and casting of copper.

BRITAIN SHOULD PRODUCE MORE MOTOR SPIRIT, said Mr. W. G. H. Heggie, of Dundee Gasworks, addressing Dundee Institute of Engineers. He said 94.2 per cent. of the spirit used was imported. Home production was increasing on account of the further employment of hydrogenation plant and more widely practised recovery at gasworks, but a great gap remained. It was past understanding why great quantities of coal gases were being manufactured without being treated for the recovery of oil in motor spirit.

MEMBERS OF THE CHEMICAL SECTION of the Leicester Literary and Philosophical Society met at the College of Technology on January 27, to hear a lecture by Mr. L. B. Priestly on modern developments in the tanning industry. Mr. Priestly explained how research had reduced the time necessary for tanning, and said that considerable economies had been effected by cutting out certain steps in the manufacture and in the sale of by-products. Mr. S. F. Bratley, in proposing thanks, said that tanning was of great importance to one of Leicester's biggest industries, and the lecture had done good service in outlining the processes involved.

THE BRANSTON ARTIFICIAL SILK CO. decided at a meeting on January 29 to accept an offer of £160,000 by the War Office for the acquisition of the company's factory at Burton-on-Trent. Mr. P. A. J. Hammett, a director, presiding, said that the War Office had promised to do what it could to absorb the personnel of the factory. The factory has been closed for nearly seven years. During this period only a small maintenance staff—under a dozen persons—has been employed in keeping the plant in order. The factory was built by the Government in the last year of the war, being intended for a national machine-gun factory. It had not been completed when the Armistice was signed, and only a part of the premises was used for repair purposes. The cost was between £1,000,000 and £1,500,000. In 1920 the premises were sold to Crosse and Blackwell, Ltd., at £650,000. Before the company decided to return to London some years later, about 1,500 people were employed. In 1927 the property was purchased by the Branston Artificial Silk Co., floated by Mr. Martin Coles Harman. Machinery stated to be worth £750,000 was installed, and for a time about 900 men, women and girls were employed.

THE APPEAL of the Caledonian Milling Co., against Aberdeen Town Council's refusal to allow them to extend their fish meal factory in Palmerston Road has been upheld. Recently the company appealed to the Department of Health against the decision of the Council not to allow the company to extend its premises to permit of new machinery being installed for the manufacture of fish meal.

EXPERIMENTS IN THE PRODUCTION of an easily ignitable smokeless domestic fuel from Scottish coals are being conducted at the Edinburgh Corporation gasworks at Granton. Consignments of suitable coals have been purchased, and are at present being treated under varying conditions in order that their possibilities may be assessed. The preliminary experiments indicate that Scottish coals can fulfil several of the required conditions.

ARRANGEMENTS ARE BEING MADE by the Society of Glass Technology to pay a week's visit to Denmark in July. An interesting programme, including visits to glass works, has been arranged by the kindness of Professor Dr. A. H. M. Andreasen, of Copenhagen. The departure from London has been provisionally fixed for Friday, July 9, at 4.10 p.m. The route will be from Harwich to Esbjerg, and thence to Odense, Nyborg, Korsor and Copentagen.

LEVER BROTHERS, LTD., and its associated companies in the soap trade in the various works throughout Great Britain have announced that as from Monday, April 5, 1937, wages of certain classes of soap works employees will be increased by 4s. per week for adult males of twenty-one years of age and over, and 2s. per week for adult females of eighteen years of age and over with proportionate increases to juniors. The effect of the wage increases will be that in England no adult male soap worker will receive less than £3, or adult female soap worker less than 32s. for a week of five days. The five-day week was adopted by Lever Brothers and its associated companies on January 1, 1936. Two thousand employees of Unilever's Stork margarine factories are also to receive higher wages. The minimum wage is to be £3 a week for male workers and £1 12s. for female workers.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Australia.—A Melbourne manufacturers' representative wishes to obtain United Kingdom agencies for synthetic resins and moulding powders; chemicals (industrial, pharmaceutical and medicinal); cellulose in sheets and tape, and artificial silk yarn, for the whole of Australia, on a basis to be arranged. (Ref. No. 686.)

British India.—A Bombay firm of manufacturers' representatives desires to secure the agency of United Kingdom manufacturers of industrial chemicals, preferably on a commission basis, for the whole of India. (Ref. No. 689.)

Austria.—An agent, established at Vienna, wishes to obtain the representation, on a commission basis, of United Kingdom exporters of coconut, shellac, and vegetable oils. (Ref. No. 703.)

Argentina.—An agent established in Buenos Aires wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of refractory products, especially fire bricks. (Ref. No. 714.)

Latest Oil Prices

LONDON, Feb. 3.—LINSEED OIL was steady. Spot, £29 5s. per ton (small quantities); Feb. and March-April, £26 15s.; May-Aug., £26 17s. 6d.; Sept.-Dec., £27 2s. 6d. naked. SOYA BEAN OIL was quiet. Oriental (bulk) afloat Rotterdam, £28 10s. per ton. RAPE OIL was slow. Crude extracted, £35 10s. per ton; technical refined, £36 10s., naked, ex mill. COTTON OIL was easy. Egyptian crude, £30 10s. per ton; refined common edible, £33 10s.; deodorised, £35 10s., naked, ex mill (small lots £1 10s. extra). TURPENTINE was quiet. American, spot, 42s. 9d. per cwt.

HULL.—LINSEED OIL.—Spot quoted £26 15s. per ton; Jan. and Feb.-April, £26 10s.; May-Aug., £26 12s. 6d.; Sept.-Dec., £26 17s. 6d. COTTON OIL.—Egyptian crude, spot, £29 10s. per ton; edible, refined, spot, £32 10s.; technical, spot, £32 10s.; deodorised, £34 10s., naked. PALM KERNEL OIL.—Crude, f.m.q., spot, £32 10s. per ton, naked. GROUNDNUT OIL.—Extracted, spot, £33 10s. per ton; deodorised, £36 10s. SOYA OIL.—Extracted, spot, £34 per ton; deodorised, £36. RAPE OIL.—Extracted, spot, £34 10s. per ton; refined, £35 10s. COD OIL.—F.o.r. or f.a.s., 27s. 6d. per cwt. in barrels. CASTOR OIL.—Pharmaceutical, 45s. per cwt.; first, 40s.; second, 38s. TURPENTINE.—American, spot, 44s. per cwt.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Open to Public Inspection

MANUFACTURE OF AZO DYESTUFFS.—I. G. Farbenindustrie. July 20, 1935. 4249/36.

PROCESS FOR THE PRODUCTION OF A GAS of definite stoichiometric composition by the carbonisation of fuels.—Didier-Werke, A.-G. July 22, 1935. 11378/36.

METHOD OF RE-MELTING AND REFINING MAGNESIUM and light metal alloys containing magnesium.—I. G. Farbenindustrie. July 19, 1935. 11653/36.

PROCESS FOR THE MANUFACTURE OF FIBRE containing pressed materials from synthetic resins.—Albert Products, Ltd. July 19, 1935. 15878/36.

SOLVENTS FOR SYNTHETIC RESINS.—Soc. Nobel Francaise. July 25, 1935. 16218/36.

MANUFACTURE OF ORGANIC ACID AMIDES.—E. I. du Pont de Nemours and Co. July 20, 1935. 16916/36.

PROCESS OF PREPARING A PRODUCT CONTAINING VITAMINS.—Standard Brands, Inc. July 23, 1935. 18188/36.

PROCESS OF AND APPARATUS FOR THE TREATMENT OR CATALYSIS of hydrocarbons or other fluids and for heat exchange.—Houdry Process Corporation. July 19, 1935. 18703/36.

FILTERS AND PURIFIERS EMPLOYED FOR CONDITIONING AIR, for example for respiration, by freeing it from poisonous gases and other injurious or undesired substances.—Soc. Italiana Pirelli. July 20, 1935. 18868/36.

BOROSILICATE GLASSES highly resistant to alkaline liquids, and method of making same.—Jenaer Glaswerk Schott and Gen. July 22, 1935. 19030/36.

PROCESS FOR MAKING STABLE PHOSPHOROUS-CONTAINING COD-LIVER OIL EMULSIONS.—J. A. Chemische Fabrik Benckiser, Ges., and F. Draisbach. July 20, 1935. 19359/36.

PROCESS FOR THE PRODUCTION OF METALLIC ZINC.—C. P. Debuch. July 23, 1935. 19432/36.

REMOVAL OF SCALE-LIKE DEPOSITS from vessels made of aluminium alloys.—M. Landauer, and K. Lochmuller. July 25, 1935. 19436/36.

ELECTROLYTIC PRODUCTION OF MAGNESIUM.—Magnesium Metal and Alloys, Ltd. July 20, 1935. 19931/36.

MANUFACTURE OF CELLULOSE DERIVATIVES.—British Celanese, Ltd. July 20, 1935. 19967/36.

PROCESS FOR THE MANUFACTURE OF POLYESTER-AMINO RESINS.—S. Bakonyi. July 19, 1935. 20094/36.

MANUFACTURE OF MATERIALS RESISTING FUEL.—I. G. Farbenindustrie. July 25, 1935. 20532/36.

PREPARATION OF IRON-TANNED LEATHER.—I. G. Farbenindustrie. July 24, 1935. 20542/36.

PROCESS FOR PRODUCING CHEMICAL REACTIONS.—L. Lowenstein. July 25, 1935. 20798/36.

Specifications Accepted with Date of Application

PROCESS FOR PURIFYING CRUDE HYDROCARBONS.—W. W. Triggs. (Gutehoffnungshütte Oberhausen, A.-G.) April 9, 1935. 459,599.

MANUFACTURE AND APPLICATION OF HALOGENATED STEARIC ACID ESTERS.—Continental Oil Co. July 7, 1934. 459,719.

MANUFACTURE AND PRODUCTION OF PIGMENT DYESTUFFS.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie.) June 11, 1935. 459,780.

MANUFACTURE AND PRODUCTION OF AZO DYESTUFFS.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie.) July 8, 1935. 459,660.

MANUFACTURE AND PRODUCTION OF POLYMERISATION PRODUCTS.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie.) July 9, 1935. 459,720.

MANUFACTURE AND PRODUCTION OF UREA-FORMALDEHYDE RESINS. Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie.) July 10, 1935. 459,788.

STABILISATION OF LUBRICATING OILS or the like.—L. W. E. Townsend. July 11, 1935. 459,789.

VALVES FOR USE IN PUMPING LIQUIDS containing solid substances under pressure.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie.) July 11, 1935. 459,662.

MANUFACTURE OF CELLULOSE.—H. Dreyfus. July 11, 1935. 790.

MANUFACTURE AND PRODUCTION OF WASHING, wetting, cleansing, dispersing, and like agents.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie.) July 11, 1935. 459,791.

PROCESS FOR STABILISING MOTOR FUELS.—A. L. Mond (Universal Oil Products Co.). July 12, 1935. 459,722.

PHOTOGRAPHIC DEVELOPERS.—W. W. Groves (I. G. Farbenindustrie.) July 12, 1935. 459,665.

MANUFACTURE OF ARTIFICIAL THREADS, bands, or the like.—W. W. Groves (I. G. Farbenindustrie.) July 12, 1935. 459,796.

MANUFACTURE OF DYESTUFF COMPOSITIONS.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie.) July 12, 1935. 459,797.

PRODUCTION OF OXYGENATED ORGANIC COMPOUNDS.—Imperial Chemical Industries, Ltd., W. A. Bone, and D. M. Newitt. July 15, 1935. 459,920.

POLYVINYL ACETAL RESINS.—Carbide and Carbon Chemicals Corporation. Aug. 29, 1934. 459,878.

MANUFACTURE OF ACYLATED AROMATIC AMINES containing the trichloromethyl group.—W. W. Groves (I. G. Farbenindustrie.) July 17, 1935. 459,881.

MANUFACTURE OF VINYL ESTERS.—I. G. Farbenindustrie. July 17, 1934. 459,882.

COLOURING AGENTS FOR GLASS BATCHES and method of employing same.—E. I. du Pont de Nemours and Co. July 18, 1934. 459,886.

MANUFACTURE OF AROMATIC AMINES containing the trifluoromethyl group.—W. W. Groves (I. G. Farbenindustrie.) July 18, 1935. 459,890.

MANUFACTURE OF INDIGOID DYESTUFFS of the pyrene series and intermediates therefor.—I. G. Farbenindustrie. July 18, 1934. 459,891.

STABILISATION AND REFINING OF CRACKED HYDROCARBON DISTILLATES.—A. L. Mond (Universal Oil Products Co.). July 18, 1935. 459,923.

MANUFACTURE OF INTERMEDIATES and azo dyestuffs derived therefrom.—E. I. du Pont de Nemours and Co. July 18, 1934. 459,894.

MANUFACTURE AND PRODUCTION OF AMINES containing two hydroxyalkyl-amino groups.—I. G. Farbenindustrie. Jan. 31, 1935. 459,746.

PROCESS FOR OBTAINING METAL COMPOUNDS of water-soluble keratin splitting products.—R. Von Wulfing and E. Moller (trading as J. A. Wulfing (firm of)). Feb. 16, 1935. 459,747.

PROCESS FOR STABILISING CELLULOSE ESTERS.—N. V. Gevaert Photo Producten. Feb. 25, 1935. 459,819-20.

STORAGE OF INFLAMMABLE OR EXPLOSIVE LIQUIDS.—K. Szilvay. March 2, 1936. (Convention date not granted.) 459,624.

SEPARATION OF HYDROXY COMPOUNDS of the cyclopentano polyhydro phenanthrene series.—Schering-Kalhbaum, A.-G. March 19, 1935. 459,759.

PROCESS OF REFINING MAGNESIUM and magnesium alloys.—I. G. Farbenindustrie. May 10, 1935. 459,912.

EXTRACTION PROCESS FOR VEGETABLE OILS.—Ges. Zur Verwertung Fauthscher Patente. May 10, 1935. 459,763.

PRODUCTION OF AZO DYESTUFFS on the fibre.—Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimiques du Nord Reuines Etablissements Kuhlmann. June 29, 1935. 459,766.

MANUFACTURE OF 1 : 4 : 5-TRIBENZOYLAMINO-8-OXYANTHRAQUINONE. Soc. of Chemical Industry in Basle. June 19, 1935. 459,770.

PROCESS FOR OBTAINING ALCOHOL free from nitrogen bases.—Naamlooze Vennootschap Internationale Suiker en Alcohol Compagnie International Sugar and Alcohol Co. Isaco. Aug. 22, 1935. 459,839.

PROCESS FOR THE MANUFACTURE OF *o*-HYDROXY-AZO DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie.) June 14, 1935. 459,949.

TREATMENT OF FIBROUS MATERIALS with liquids.—Dr. A. Wacker Ges. Fur Elektrochemische Industrie Ges. June 30, 1934. 460,140.

MANUFACTURE AND PRODUCTION OF ALKYL HALIDES and of unsaturated organic compounds.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie.) July 15, 1935. 460,143.

MANUFACTURE OF SOLID MATERIALS in liquids.—A. P. Lowes and Imperial Chemical Industries, Ltd. July 15, 1935. 460,144.

APPARATUS FOR THE MANUFACTURE AND PRODUCTION OF ACETYLDEHYDE from gases containing acetylene.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie.) July 16, 1935. 460,145.

MANUFACTURE AND PRODUCTION OF QUATERNARY AMMONIUM COMPOUNDS.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie.) July 16, 1935. 460,146.

MANUFACTURE AND PRODUCTION OF SALT-LIKE COMPOUNDS of the phthalocyanine series and dyeing cellulose therewith.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie.) July 16, 1935. 460,147.

PROCESS AND APPARATUS FOR DE-HAIRING HIDES.—M. Martens, and A. Van Osselaer.—July 18, 1934. 460,283.

DYEING OF CELLULOSE ESTERS and ethers.—H. M. Bunbury, C. H. Giles, and Imperial Chemical Industries, Ltd. July 19, 1935. 460,027.

PROCESS FOR THE MANUFACTURE OF A STABLE PRODUCT therapeutically useful in relation to bleeding.—A. Carpmael (I. G. Farbenindustrie.) July 19, 1935. 460,193.

RECOVERY OF TIN from tin scrap.—A. Thomas. July 19, 1935. 460,029.

STORAGE AND HANDLING OF HYDROGEN-PEROXIDE SOLUTIONS.—E. I. du Pont de Nemours and Co., and J. S. Reichert. July 22, 1935. 460,208.

MANUFACTURE OF PHOTO-LUMINESCENT GLASS.—I. G. Farbenindustrie. July 21, 1934. 460,210.

PRODUCTION OF BENZINES from middle oils or crude benzines rich in phenols and olefines by hydrogenation.—H. E. Potts (International Hydrogenation Patents Co., Ltd.). July 23, 1935. 460,151.

MANUFACTURE AND PRODUCTION OF UREAFORMALDEHYDE RESINS. Coutts and Co., and F. Johnson (I. G. Farbenindustrie.) July 23, 1935. 460,275.

PROCESS FOR IMPROVING THE PROPERTIES OF PHTHALOCYANINE DYESTUFFS.—Coutts and Co., and F. Johnson (I. G. Farbenindustrie.) July 23, 1935. 460,152.

MANUFACTURE AND PRODUCTION OF AZO DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) July 23, 1935. 460,276.

MANUFACTURE OF AZO DYESTUFFS.—O. Carpmael (I. G. Farbenindustrie.) July 23, 1935. 460,224.

Applications for Patents

(January 14 to 20 inclusive.)

MANUFACTURE OF ACID-PROOF MORTAR.—W. W. Groves (I. G. Farbenindustrie.) 803.

MANUFACTURE OF WASHING-AGENTS.—W. W. Groves (I. G. Farbenindustrie.) 804.

PROCESS OF PURIFYING FEATHERS.—W. W. Groves (I. G. Farbenindustrie.) 934.

MANUFACTURE OF CELLULOSE.—M. Günther. (Germany, Jan. 28, '36.) 550.

METALLIC-POWDER AGGREGATES.—C. P. Harris. (United States, Jan. 18, '36.) 515.

AIR-FILTERING, ETC. APPARATUS.—S. Holt. 706.

MEANS FOR ENAMELLING IRON.—I. G. Farbenindustrie. (Germany, Jan. 11, '36.) 799.

MANUFACTURE OF THIAZOLIDINE DERIVATIVES.—I. G. Farbenindustries. 800, 801.

HYDRAULIC PRESSES.—Imperial Chemical Industries, Ltd. 731.

BLASTING MEANS.—Imperial Chemical Industries, Ltd., and J. Taylor. 861.

MANUFACTURE OF AMMONIUM SULPHATE.—Imperial Chemical Industries, Ltd., and M. P. Appleby. 954.

WATER-SOFTENING APPARATUS.—A. D. Jenkins. 830.

MANUFACTURE OF ARTIFICIAL FIBRES.—F. Johnson (Legal representative of J. Y. Johnson). (I. G. Farbenindustrie), and Coutts and Co. (July 15, '35.) 1084.

MANUFACTURE, ETC., OF CONDENSATION PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie.) 531.

MANUFACTURE, ETC. OF POLYAZO DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) 532.

PRODUCTION OF EMULSIONS.—G. W. Johnson (I. G. Farbenindustrie.) 823.

MANUFACTURE OF COMPOUNDS of anthraquinone series.—G. W. Johnson (I. G. Farbenindustrie.) 1082.

MANUFACTURE OF ACRIDONE DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) 1083.

MANUFACTURE OF RED OXIDE PIGMENTS.—A. P. Laurie. 982.

GAS MASKS.—F. H. Le Sueur and J. S. Waters. 810.

BOMBS, ETC.—Manufacture d'Armements et de Munitions Armu Soc. Anon. (Belgium, Jan. 9, '36.) 852.

TREATMENT OF CELLULOSE DERIVATIVE MATERIALS.—R. W. Moncrieff. 1044.

REMOVING CARBON DEPOSITS, ETC.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (United States, Nov. 23, '36.) 559.

POLYMERISATION, ETC. OF UNSATURATED COMPOUNDS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (Holland, Feb. 11, '36.) 647.

MANUFACTURING COMPLEX ORGANIC COMPOUNDS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (Holland, Feb. 25, '36.) 648.

RECOVERING ALKYLOL AMINES on refining fatty oils, etc., of ester type.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappii. (Holland, Feb. 26, '36.) 649.

PRODUCTION OF HIGH-BOILING PRODUCTS from solid carbonaceous materials.—H. E. Potts. (International Hydrogenation Patents Co., Ltd.). 698.

TREATMENT OF HYDROCARBON GASES.—C. Barbieri. 1291.

MANUFACTURE OF DERIVATIVES of oestradiol.—A. G. Bloxam (Soc. of Chemical Industry in Basle). 1399.

PRODUCTION OF AMINES.—C. Barbieri. 1745.

MANUFACTURE OF AMINO COMPOUNDS of the anthraquinone series. British Celanese, Ltd., G. Reeves, and G. Lord. 1691.

MANUFACTURE OF UREA-FORMALDEHYDE MOULDING POWDERS.—British Industrial Plastics, Ltd., C. H. Cooper, and E. C. Rossiter. 1149.

PRODUCTION OF REACTIVE HYDROGEN.—D. Gardner. 1588.

MANUFACTURE OF SYNTHETIC RUBBER.—A. Carpmael (I. G. Farbenindustrie.) 1147.

WATER-SOFTENING INSTALLATIONS.—Chemische Fabrik Budenheim, A.-G. (Germany, Jan. 17, '36.) 1187.

FERROUS ALLOYS.—Cleveland Twist Drill Co. (United States, Aug. 5, '36.) 1717.

PROTECTING RECTIFIERS WITH AN IONISED GAS.—M. Demontvignier. (France, Jan. 25, '36.) 1222.

MANUFACTURE AND TREATMENT OF ORGANIC MATERIALS.—H. Dreyfus. 1468.

MANUFACTURE OF FORMYLAMINOANTHRAQUINONES.—E. I. du Pont de Nemours and Co. (United States, Jan. 18, '36.) 1320.

MANUFACTURE OF ANTHRAQUINONE DERIVATIVES.—E. I. du Pont de Nemours and Co. (United States, Jan. 18, '36.) 1525.

PROTEIN DERIVATIVES.—E. I. du Pont de Nemours and Co. (United States, Jan. 17, '36.) 1529.

TREATMENT OF EXTRACTION PRODUCTS of carbonaceous materials. H. E. Potts (International Hydrogenation Patents Co., Ltd.). 882.

REMOVAL, ETC., OF ACIDIC GASES.—Robinson Bros., Ltd., and D. W. Parkes. 658.

APPARATUS FOR CONTINUOUS TREATMENT OF SOLID CARBONACEOUS FUELS.—P. M. Schuftan. 631.

MANUFACTURE OF POLYAZO-DYESTUFFS.—Soc. of Chemical Industry in Basle. 791, 792, 793, 794.

MANUFACTURE OF DYESTUFFS OF ANTHRAQUINONE SERIES.—Soc. of Chemical Industry in Basle. (Switzerland, Jan. 10, '36.) 797, 798.

ION-EXCHANGE AND ACID-REMOVING MATERIALS.—United Water Softeners, Ltd., and E. L. Hohner. 656.

MANUFACTURE OF AMINE RESINS.—W. W. Groves (I. G. Farbenindustrie, A.-G. 1706.

SYNTHETIC RUBBER COMPOSITION.—Hercules Powder Co. (United States, Jan. 31, '36.) 1599.

MANUFACTURE OF AMIDE DERIVATIVES of isoxazole carboxylic acids.—F. Hoffman-La Roche and Co., A.-G. (Switzerland, March 20, '36.) 1246.

MANUFACTURE OF THE SUBSTANCE PROMOTING LACTATION from the anterior lobes of the hypophysis.—I. G. Farbenindustrie. (Germany, Jan. 15, '36.) 1261.

MANUFACTURE OF THE ACTIVE EXTRACTS of the anterior lobes of the hypophysis.—I. G. Farbenindustrie. (Germany, Jan. 18, '36.) 1262.

MANUFACTURE OF PLASTIC MASSES, and shaped articles therefrom. I. G. Farbenindustrie. (Germany, Jan. 16, '36.) 1263.

MANUFACTURE, ETC., OF RESINOUS CONDENSATION PRODUCTS.—I. G. Farbenindustrie. (Germany, Jan. 18, '36.) 1506.

MANUFACTURE OF QUATERNARY AMMONIUM SALTS.—Imperial Chemical Industries, Ltd., and H. A. Piggott. 1192.

FINISHING TEXTILES.—Imperial Chemical Industries, Ltd. 1193.

MANUFACTURE OF COATING COMPOSITIONS.—Imperial Chemical Industries, Ltd. 1318.

MANUFACTURE OF CHLORINATED RUBBER PRODUCTS.—Imperial Chemical Industries, Ltd., A. P. Lowes, J. P. Baxter, and E. Moores. 1319.

COLOURATION OF OXIDE FILMS ON ALUMINIUM, ETC.—Imperial Chemical Industries, Ltd., and J. A. Radler. 1526.

MANUFACTURE OF CELLULOSE ESTERS of aliphatic acids.—Imperial Chemical Industries, Ltd., and A. J. Walters. 1640.

TREATING VEGETABLE AND ARTIFICIAL FIBROUS MATERIALS.—G. W. Johnson (I. G. Farbenindustrie.) 1290.

MANUFACTURE, ETC., OF VAT DYESTUFFS.—G. W. Johnson. 1477.

APPARATUS FOR DISPERSING GAS MATERIAL.—Linde Air Products Co. (United States, Feb. 18, '36.) 1106.

REMOVAL OF SUSPENDED PARTICLES FROM GASES.—Lodge-Cottrell, Ltd. (Research Corporation of New York.) 1244.

LOW-TEMPERATURE BRAZING-ALLOYS for uniting duralumin.—P. Pichard, and J. Schmit. 1612.

PRODUCTION OF HYDROCARBON PRODUCTS.—H. E. Potts (International Hydrogenation Patents Co.). 1542.

COAGULATING RUBBER LATICES OF HIGH RESIN CONTENT.—Revertex, Ltd., and F. K. Daniel. 1747.

MANUFACTURE OF PLASTIC DISPERSIONS of water-in-oil type.—H. Schou. 1633.

APPARATUS FOR PURIFYING GASES obtained by distillation of carbonaceous materials.—P. M. Schuftan. 1455.

PRODUCTION OF CARBOHYDRATE COMPOUNDS.—S. Sokal (Kalle and Co., A.-G.) 1163.

MANUFACTURE OF GASOLINE-LIKE HYDROCARBONS.—A. H. Stevens (Process Management Co.). 1622, 1623.

PRODUCTION OF FATTY ACIDS.—C. Weizmann. 1443.

TREATING MATERIALS.—Aceta Ges. (Germany, Feb. 6, '36.) 2302.

APPARATUS FOR MIXING LIQUIDS WITH GASES.—O. Bühring. (Germany, Jan. 22, '36.) 1841.

APPARATUS FOR MIXING LIQUIDS WITH GASES.—O. Bühring. (Germany, April 30, '36.) (Cognate with 1841.) 1842.

REDUCTION OF METAL-SULPHIDE ORES.—Calloy, Ltd., and G. N. Kirsebour. 2387.

DEPUTATION OF MINERAL OILS.—A. Cannata. 2392.

INCREASING AFFINITY FOR DYESTUFFS of articles of cellulose, etc. A. Carpmael (I. G. Farbenindustrie.) 1836.

MANUFACTURE OF CO-CARBOXYLASE.—A. Carpmael (I. G. Farbenindustrie.) 1837.

MANUFACTURE OF CELLULOSE ESTER SOLUTIONS for spinning.—A. Carpmael (I. G. Farbenindustrie.) 1979.

Forthcoming Events

LONDON.

Feb. 9.—Institute of the Plastics Industry and Representative Motor Manufacturers and Traders. "Plastics in the Motor Trade." British Industries House Club, Oxford Street, London.

Feb. 9.—Society of Chemical Industry (Road and Building Materials Group). "Road Plant." J. M. Collie. 8 p.m. Rooms of the Chemical Society, Burlington House, Piccadilly, London.

Feb. 9.—Pharmaceutical Society. "The Addendum 1936 to the British Pharmacopœia 1932." C. H. Hampshire. 8.30 p.m. 17 Bloomsbury Square, London.

Feb. 10.—Institute of Chemistry. Visit to Battersea Power Station, London.

Feb. 10.—Institute of Fuel. "Heat Insulation: The Selection of Suitable Materials for Various Purposes." J. S. F. Gard. 6 p.m. Rooms of the Chemical Society, Burlington House, Piccadilly, London.

Feb. 10.—Electrodepositors' Technical Society. Symposium on "Bright Nickel Plating." 8.15 p.m. Northampton Polytechnic Institute, St. John Street, Clerkenwell, London.

Feb. 11.—Institute of Metals. (London Section). "The Constitution of Alloys. C. H. Desch. 7.30 p.m. Rooms of the Society of Motor Manufacturers and Traders, Ltd., 83 Pall Mall, London.

Feb. 11.—Institute of Vitreous Enamellers. (Southern Section). "A Resume of Some Studies on Sheet Steel Ground Coat Enamels." Professor R. M. King (read by A. Edwards). 8 p.m. British Industries House, Marble Arch, London.

Feb. 12.—Physical Society. Ordinary Meeting. 5 p.m. Imperial College of Science and Technology, Imperial Institute Road, South Kensington, London.

Feb. 12.—Royal Institution of Great Britain. "Pigments Associated with Fatty Tissues." Professor I. M. Heilbron. 9 p.m. 21 Albemarle Street, London.

GRANGEMOUTH.

Feb. 8.—Society of Chemical Industry and Institute of Chemistry (Edinburgh and East of Scotland Sections). "Vat Dyes in Practice." J. I. M. Jones. 7.30 p.m. Anthraquimone Club Rooms, Scottish Dyes, Grangemouth.

LIVERPOOL.

Feb. 10.—British Association of Chemists (Liverpool Section). Demonstration of laboratory apparatus. 7.30 p.m. The University, Liverpool.

Feb. 11.—Institute of Chemistry (Liverpool and North Western Section). "The Function of the Analyst in the Detection of Crime." Professor W. H. Roberts. 7.30 p.m. Constitutional Club, India Buildings, Water Street, Liverpool.

MANCHESTER.

Feb. 11.—Institute of Chemistry (Manchester Section). "As Others See Us." B. D. W. Luff. 7 p.m. Constitutional Club, St. Ann's Street, Manchester.

Feb. 12.—Oil and Colour Chemists Association (Manchester Section). Ordinary meeting. 7 p.m. The Reynolds Hall, College of Technology, Sackville Street, Manchester.

SHEFFIELD.

Feb. 12.—Institute of Metals. (Sheffield Section) and Institute of Chemistry (South Yorkshire Section). Conjoint meeting. 7.30 p.m. Non-Ferrous Section. Applied Science Department, The University, St. George's Square, Sheffield.

STOKE-ON-TRENT.

Feb. 8.—Ceramic Society. (Pottery Section). "Design in the Pottery Industry." Gordon M. Forsyth. 7.30 p.m. North Staffordshire Technical College, Stoke-on-Trent.

STOURBRIDGE.

Feb. 8.—Society of Glass Technology (Midlands Section). Film "The Birth of a Therm," or "The Romance of a Lump of Coal," presented by L. P. Ingram. "Application of Town Gas to the Glass Industry." H. W. Allan and D. C. Gunn. 7.30 p.m. Talbot Hotel, Stourbridge.

SWANSEA.

Feb. 9.—Institute of Metals. (Swansea Section). "Strip Rolling." W. R. Barclay. 6.30 p.m. Y.M.C.A., Swansea.

Chemical and Allied Stocks and Shares

THE stronger tendency in commodity prices and the improved trend in British Government stocks resulted in increased business in the stock and share markets this week. Imperial Chemical have lost their improvement of the previous week and are 40s. 6d., compared with 41s. 1½d. The general assumption in the market is that the directors are likely to continue to limit the dividend to 8 per cent. Courtaulds were active around 56s. 6d. In this case there is considerable divergence of opinion as to whether the forthcoming announcement will show an increase over the 7½ per cent. tax free, dividend paid for the previous year. Salt Union have moved up from 44s. 9d. to 45s. 3d. on the possibility that a bonus may be in prospect.

British Oxygen were active at higher prices, partly on market talk that the further expansion of the business indicated by recent announcements may mean that as time proceeds additional capital may be required, in which case shareholders might have the offer of shares on favourable or bonus terms. United Molasses have risen 9d. to 27s. 3d., largely owing to the continued belief that the company's profits may benefit a good deal from the current trend in tanker freight rates. Distillers were moderately higher at 117s. 6d., but have been rather less active, the disposition in the market being to await the Budget for news as to whether the company will have to face increased taxation; the latter is not generally expected, and anticipations of a larger dividend or of a bonus of some kind remain current. There was a rise of 1s. 6d. to 31s. in General Refractories on anticipations that the dividend may very well be maintained despite the larger capital in issue. International Diatomite 5s. shares were firm at 7s., aided by the initial interim dividend. Triplex Safety Glass have been steadier in advance of the meeting. Fison, Packard and Prentice ordinary shares were steady as were the 4¼ per cent. preference shares of National Fertilisers, the latter having remained at 21s. Cooper, McDougall and Robertson were firm at 37s. 6d. on the possibility of a moderately larger dividend, and on the belief that in their report the directors will be able to refer to improved prospects.

British Glues moved up a few pence to 11s., aided by favourable views of dividend prospects, and British Industrial Plastics continued to change hands actively around 3s. There was strong demand for Swedish Match "B" which are fully 1s. higher at 21s. 6d., there being anticipations that the next report will show considerable improvement in the position, although it is not expected that dividends will be resumed for some while yet. Wall Paper deferred units continued to received increased attention owing to the good yield offered and have now improved to 44s. 6d. British Oil and Cake Mills preferred ordinary remained steady awaiting the forthcoming results, and United Premier Oil and Cake ordinary were active up to 11s. 4½d.

British Plaster Board were higher at 44s. on the good yield offered and growing anticipations that the dividend may very well be maintained on the larger capital in issue.

Iron, steel and kindred shares were moderately higher, including Richard Thomas. The new ordinary shares of the latter company will not rank for dividend in respect of the financial year ending March 31, and the market is hopeful that the dividend may be raised from 12½ per cent. to 15 per cent. United Steel Companies ordinary were more prominent in view of the large expansion of the business which is in prospect, judging from the official statement made last week. The market is continuing to assume that the company will maintain its interim dividend at 2½ per cent.

Boots Pure Drug were active around 60s. partly on continued talk of a bonus, and partly owing to the assumption that the results for the year ending March 31 may show excellent results as the influenza epidemic has possibly led to increased sales at the company's shops.

Borax Consolidated were steady at 36s., awaiting the forthcoming dividend announcement. Barry and Staines Linoleum were active around 53s. 9d., on the possibility of a larger distribution. "Shell" and other prominent oil companies were bought on talk of a further increase in the price of petrol during the next few months.

Books Received

Report of the Building Research Board for the Year 1935. London: His Majesty's Stationery Office. Pp. 176. 3s. 6d.

Laboratory Methods of Organic Chemistry. By L. Gatterman. Completely revised by Heinrich Wieland. Translated from the Twenty-fourth German edition by W. McCartney. London: MacMillan & Co., Ltd. Pp. 435. 18s.

Survey of the Import Trade of India. (1st April, 1936 to 30th September, 1936). Prepared by His Majesty's Senior Trade Commissioner in India. London: Department of Overseas Trade. Pp. 21.

Weekly Prices of British Chemical Products

THERE are no price changes to report in the London markets for heavy chemicals, rubber chemicals, wood distillation products, pharmaceutical and photographic chemicals, essential oils, intermediates and perfumery chemicals. In the coal tar products section there has been an all round increase of from 1d. to 2d. per gal. in all grades of cresylic acid, and pyridine 90/140 is 6d. per gal. dearer than a week ago. Unless otherwise stated, the prices below cover fair quantities net and naked at sellers' works.

MANCHESTER.—In odd sections of the Manchester market for chemical products during the past week slight uneasiness has been in evidence, but prices are still for the most part on a distinctly steady basis and trading conditions are generally satisfactory. So far as new transactions are concerned, business has continued on relatively moderate lines, with the usual flow of small orders for near delivery positions. A favourable feature of the situation is that the extensive contracts already placed are being steadily drawn against, with the cotton and woollen textile industries of Lancashire and West Yorkshire making a satisfactory showing in this respect. Among the by-products, pitch is a shade firmer than it has been of late and a certain amount of speculative buying has been reported, whilst cresylic acid is in exceedingly short supply and a further stiffening of prices has occurred though buyers are finding it difficult to secure parcels for early delivery.

GLASGOW.—Business in general chemicals has been rather quieter during the week, both for home trade and export. Prices, however, continue very steady at about previous figures, the general tendency being towards higher prices. In the coal tar products section the demand for all grades of cresylic acid continues phenomenal, and prices again show an advance on last week's figures. Quantities offered at the higher rates are, of course, small. Carbolic acid is also very firm. Most of the lighter fractions are moving well and stocks generally are low. Firelighter crude naphthalene seems a little easier with fresh quotations being made from £6 to £7 per ton (bags free). Some pitch has been booked for both home and export, but on the whole this product remains comparatively quiet.

General Chemicals

ACETONE.—£62 to £65 per ton; SCOTLAND: £64 to £65 ex wharf, according to quantity.

ACID, ACETIC.—Tech., 80%, £30 5s. to £32 5s. per ton; pure 80%, £30 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £32 5s.; tech., 80%, £30 5s., d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ACID, BORIC.—Commercial granulated, £27 per ton; crystal, £28; powdered, £29; extra finely powdered, £31; packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. B.P. cryst., £36; B.P. powder, £37. SCOTLAND: Crystals, in 1 cwt. bags, £28; powdered, in 1 cwt. bags, £29.

ACID, CHROMIC.—9½d. per lb., less 2½%; d/d U.K.

ACID, CITRIC.—1s. per lb. MANCHESTER: 11¾d. SCOTLAND: B.B. crystals, 1s. per lb., less 5%.

ACID, CRESYLIC.—97/99%, 3s. 3d. to 3s. 4d. per gal.; pale, 98%, 3s. 1d. to 3s. 2d.; dark, 2s. 6d. to 2s. 7d.; 99/100%, refined, 3s. 8d. to 3s. 10d. per gal. MANCHESTER: 99/100%, pale, 3s. 8d.

ACID, FORMIC.—85%, in carboys, ton lots, £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 5s. to 7s. 6d. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50: pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works. SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—£48 15s. to £57 10s. per ton, according to packages and position. SCOTLAND: £2 9s. per cwt. in casks. MANCHESTER: £49 10s. to £54 per ton ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—11¾d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. SCOTLAND: 11⅞d. less 5%. MANCHESTER: 11¾d. to 1s. per lb.

ALUM.—SCOTLAND: Ground, £10 2s. 6d. per ton; lump, £9 12s. 6d.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19 (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM SULPHATE.—Neutral quality, 20.6% nitrogen, £7 5s. per ton.

ANTIMONY OXIDE.—SCOTLAND: £61 to £65 per ton, c.i.f. U.K. ports.

ARSENIC.—LONDON: £13 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £17 ex store. MANCHESTER: White powdered Cornish £17 10s. ex store.

BARIUM CHLORIDE.—£11 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.b. London

BLEACHING POWDER.—Spot, 35/37%. £8 15s. per ton in casks, special terms for contracts. SCOTLAND: £9.

BORAX COMMERCIAL.—Granulated, £14 10s. per ton; crystal £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots SCOTLAND: Granulated, £14 10s. per ton in 1 cwt. bags, carriage paid.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums. SCOTLAND: 70/75% solid, £5 10s. per ton net ex store.

CHROMETAN.—Crystals, 2¾d. per lb.; liquor, £19 10s. per ton d/d

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £3 19s. net.

DINITROTOLUENE.—66/68° C., 9d. per lb.

FORMALDEHYDE.—LONDON: £24 10s. per ton. SCOTLAND: 40% £25 to £28 ex store.

GLYCERINE.—Chemically pure, double distilled, 1,260 s.g., in tins £4 17s. 6d. to £5 17s. 6d. per cwt. according to quantity; in drums, £4 10s. to £5 3s. 6d.

IODINE.—Resublimed B.P., 5s. 1d. per lb.

LEAD ACETATE.—LONDON: White, £33 15s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £36, brown, £35.

LEAD NITRATE.—£32 10s. to £34 10s. per ton.

LEAD, RED.—SCOTLAND: £41 per ton less 2½%, carriage paid, for 2-ton lots.

LEAD, WHITE.—SCOTLAND: £41 per ton, carriage paid. LONDON: £41.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store

MAGNESIUM CHLORIDE.—SCOTLAND: £7 per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s 6d to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

PARAFFIN WAX.—SCOTLAND: 3⅝d. per lb.

PHENOL.—6⅞d. to 7¼d. per lb.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £39 10s.

POTASSIUM BICHROMATE.—SCOTLAND: 5d. per lb., less 5%, carriage paid.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 4½d. per lb. MANCHESTER: £38 per ton.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P. 4s. 3d. per lb.

POTASSIUM NITRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8½d. per lb. SCOTLAND: B.P. Crystals, 9¾d. MANCHESTER: B.P. 10¾d. to 11½d.

POTASSIUM PRUSSATE.—LONDON: Yellow, 7½d. to 8d. per lb. SCOTLAND: 7d. net, in casks, ex store. MANCHESTER: Yellow, 6½d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. SCOTLAND: Large crystals, in casks, £37 10s.

SALT CAKE.—Unground, spot, £3 16s. 6d. per ton.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags

SODA, CAUSTIC.—Solid, 76/77° spot, £12 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—LONDON: £21 per ton. SCOTLAND: £19 per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station

in bags. SCOTLAND: £12 10s. per ton in 1 cwt. kegs, £10 15s. per ton in 2 cwt. bags. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. Anhydrous, 5d. per lb. LONDON: 4d. per lb. less 5% for spot lots and 4d. per lb. with discounts for contract quantities. MANCHESTER: 4d. per lb. SCOTLAND: 4d., less 5% carriage paid.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality, 7s. 6d. per ton extra. Light Soda Ash, £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£29 per ton. SCOTLAND: £1 10s. per cwt.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10; photographic, £14 10s.

SODIUM IODIDE.—B.P., 6s. per lb.

SODIUM METASILICATE.—£14 per ton, d/d U.K. in cwt. bags.

SODIUM NITRITE.—LONDON: Spot, £18 5s. to £20 5s. per ton d/d station in drums.

SODIUM PERBORATE.—10%, 9¼d. per lb. d/d. in 1-cwt. drums. LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£13 per ton.

SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 4¼d. to 4½d.

SODIUM SILICATE.—140° Tw. Spot, £8 per ton. SCOTLAND: £8 10s.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material, £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d. to £3 5s.

SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 5s. per ton d/d in drums; crystals 30/32%, £8 15s. per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid, 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8.

SODIUM SULPHITE.—Pea crystals, spot, £13 5s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.

SULPHATE OF COPPER.—MANCHESTER: £19 10s. per ton f.o.b. SCOTLAND: £21 per ton less 5%, Liverpool, in casks.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON: £12 per ton. SCOTLAND: £10 10s.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1d. per lb., according to quality. Crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARYTES.—£6 to £7 10s. per ton, according to quality.

CADMIUM SULPHIDE.—4s. 9d. to 5s. per lb.

CARBON BISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.

CARBON BLACK.—3 11/16d. to 4 13+16d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.

CHROMIUM OXIDE.—Green, 1s. 2d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

INDIA-RUBBER SUBSTITUTES.—White, 4½d. to 5d. per lb.; dark, 3¾d. to 4¼d. per lb.

LAMP BLACK.—£22 to £23 per ton.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE.—30%, £16 5s. to £17 per ton.

SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.

VERMILLION.—Pale, or deep, 5s. 1d. per lb., 1-cwt. lots.

ZINC SULPHIDE.—10d. to 11d. per lb., according to quality.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—Neutral quality, basis 20.6 per cent. nitrogen, delivered in 6-ton lots to farmer's nearest station, February, £7 3s. 6d. per ton; March to June, £7 5s. per ton.

CALCIUM CYANAMIDE.—February, £7 2s. 6d. per ton; March, £7 3s. 9d. per ton; April to June, £7 5s. per ton, carriage paid to any railway station in Great Britain in lots of four tons and over.

NITRO-CHALK.—£7 5s. per ton for delivery to end of June.

NITLATE OF SODA.—£7 12s. 6d. per ton for delivery up to end of June.

CONCENTRATED COMPLETE FERTILISERS.—£10 12s. to £11 1s. per ton for delivery up to end of June, delivered in 6-ton lots to farmer's nearest station.

AMMONIUM PHOSPHATE FERTILISERS.—£10 5s. to £13 15s. per ton for delivery up to end of June, delivered in 6-ton lots to farmer's nearest station.

Coal Tar Products

ACID, CRESYLIC.—97/99%, 3s. 3d. to 3s. 4d. per gal.; 99/100%, 3s. 8d. to 4s. 6d. per gal., according to specification; pale 99%, 3s. 5d. to 3s. 6d.; dark, 2s. 10d. to 3s. GLASGOW: Pale, 99/100%, 3s. 3d. to 3s. 9d. per gal.; pale, 97/99%, 3s. to 3s. 4d., dark, 97/99%, 2s. 6d. to 2s. 9d.; high boiling acids, 1s. 10d. to 2s.; American specification, 2s. 9d. to 3s. 3d. MANCHESTER: Pale, 99/100%, 3s. 9d.

ACID, CARBOLIC.—Crystals, 6¾d. to 7¼d. per lb.; crude, 60's, 2s. 7d. to 2s. 9d. per gal. MANCHESTER: Crystals, 6¾d. to 7d. per lb.; crude, 2s. 8d. per gal. GLASGOW: Crude, 60's, 2s. 6d. to 2s. 9d. per gal.; distilled, 60's, 2s. 9d. to 3s. 3d.

BENZOL.—At works, crude, 9d. to 9½d. per gal.; standard motor 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 8d. to 1s. 8½d. LONDON: Motor, 1s. 3½d. GLASGOW: Crude, 9d. to 10d. per gal.; motor, 1s. 2d. to 1s. 3d.

CREOSOTE.—B.S.I. Specification standard, 5¾d. to 6d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 4½d. f.o.r. North: 5d. London. MANCHESTER: 5½d. to 6d. GLASGOW: B.S.I. Specification 5½d. to 5¾d. per gal.; washed oil, 4¾d. to 5¼d.; lower sp. gr. oils, 5d. to 5½d.

NAPHTHA.—Solvent, 90/160%, 1s. 6½d. to 1s. 7½d. per gal.; 95/160%, 1s. 7d.; 90/190%, 1s. 1d. to 1s. 2½d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. GLASGOW: Crude, 5½d. to 6d. per gal.; 90% 160, 1s. 3d. to 1s. 4d.; 90% 190, 1s. to 1s. 1d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £11 10s. to £12 10s. per ton; purified crystals, £18 to £20 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £5 to £5 10s. per ton; crystals, £27 to £27 10s. GLASGOW: Fire lighter, crude, £6 to £7 per ton (bags free).

PYRIDINE.—90/140%, 8s. 6d. to 9s. 6d. per gal.; 90/180, 2s. 6d. to 3s. GLASGOW: 90% 140, 9s. to 10s. per gal.; 90% 160, 7s. to 8s.; 90% 180, 2s. 6d.

TOLUOLE.—90%, 2s. per gal.; pure, 2s. 5d. GLASGOW: 90%, 120, 1s. 10d. to 1s. 11d. per gal.

PITCH.—Medium, soft, 34s. per ton, in bulk at makers' works. MANCHESTER: 34s. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 28s. 6d. to 35s. per ton; in bulk for home trade, 32s. 6d.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 10s. to £9 per ton; grey, £10 10s. to £11. Liquor, brown, 30° Tw., 6d. to 8d. per gal. MANCHESTER: Brown, £9 10s.; grey, £11 10s.

CHARCOAL.—£5 5s. to £10 per ton, according to grade and locality.

METHYL ACETONE.—40-50%, £43 to £46 per ton.

WOOD CREOSOTE.—Unrefined 6d. to 9d. per gal., according to boiling range.

WOOD NAPHTHA, MISCIBLE.—2s. 6d. to 3s. 3d. per gal.; solvent, 3s. 3d. to 3s. 6d. per gal.

WOOD TAR.—£2 to £3 per ton.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex toluol).—1s. 9½d. per lb. d/d buyer's works.

ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.

ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 8d. per lb.

ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.

ACID, SULPHANILIC.—Spot, 8d. per lb. 100%, d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot. 8d. per lb. d/d buyer's works, casks free

BENZIDINE, HCl.—2s. 5d. per lb., 100% as base, in casks.

m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

o-CRESEL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.

p-CRESOL 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.

DICHLORANILINE.—2s. 3d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.

DINITROBENZENE.—7½d. per lb.

DINITROCHLORBENZENE, SOLID.—£72 per ton

DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 10d.

DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works

α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works

β-NAPHTHOL.—In bags, £88 15s. per ton; in casks, £89 15s.

α-NAPHTHYLAMINE.—Lumps, 1s. per lb.; ground, 1s. 0½d. in casks.

β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works in casks.

o-NITRANILINE.—3s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works

p-NITRANILINE.—Spot, 1s. 8d. to 2s. 1d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.

NITRONAPHTHALENE.—9d. per lb.; P.G., 1s. 0½d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb., 100% d/d buyer's works.

o-TOLUIDINE.—10½d. per lb., in 8/10-cwt. drums, drums extra.

p-TOLUIDINE.—1s. 10½d. per lb., in casks.

m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

Latest Oil Prices on page 124.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BARKER BROTHERS (SIMPSON CLOUGH), LTD., Heywood, bleachers, etc. (M., 6/2/37.) January 26, mortgages securing £5,500 and £137 11s. 6d., to Mrs. H. Barker, Heywood, and another; charged on Simpson Clough Mill, with houses, etc. *Nil. Aug. 6, 1936.

HORDEN, SAMPSON, LTD., London, W., manufacturers of solvent products, etc. (M., 6/2/37.) January 22, £200 debenture, to Mrs. E. Sampson, London, and another; general charge. *Nil. December 7, 1936.

Satisfactions

MACSONS, LTD., Blyth, manufacturing chemists, etc. (M.S., 6/2/37.) Satisfactions January 25, of charges registered September 8, 1919, and April 17, 1924.

County Court Judgments

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

WAINWRIGHT, K., 49a The Close, Newcastle-on-Tyne (trading as Northern Distributors Newcastle), chemical merchant. (C.C., 6/2/37.) £29 14s. 2d. November 26.

WILLAN AND STEELE (firm), Robot Buildings, Laisterdyke, manufacturing chemists. (C.C., 6/2/37.) £13 14s. 9d. December 29.

Deed of Arrangement

(The following deeds of arrangement with creditors have been filed under the Deeds of Arrangement Act, 1914. Under this Act it is necessary that private arrangements other than those executed in pursuance of the Bankruptcy Act shall be registered within seven clear days after the first execution by the debtor or any creditor. These figures are taken from the affidavit filed with the registered deed, but may be subject to variation on realisation.)

CURTIS, ALBERT BELA BERTRAM, 6 Ludgate Circus Buildings, Ludgate Hill, E.C., and 87 Claverton Street, Victoria, manufacturing chemist. (D.A., 6/2/37.) Dated January 14, filed January 19. Trustee, P. S. Booth, 14 Holborn Viaduct, E.C. Secured creditors £29. Liabilities unsecured £1,566. Assets, less secured claims, £1,362.

Companies Winding-up Voluntarily

PRESTON'S DIGESTER LINING CO., LTD. (C.W.U.V., 6/2/37.) By special resolution, January 12, 1937. William Orrell Buxton, of Savings Bank Buildings, Bury, Lancs., appointed liquidator.

Company News

English Velvet and Cord Dyers' Association.—The directors have decided that no dividend be recommended on the preference or the ordinary shares for the year ended December 31, 1936. The accounts show a small net profit for the year, which compares with a net loss of £25,897 for 1935. The company, of which Mr. G. E. Holden is chairman, has an authorised capital of £1,000,000, of which £647,011 is issued in £211,886 5 per cent. cumulative preference shares and £435,125 ordinary shares, both of £1. Dividends on the preference capital are in arrears from January 1, 1935, and the last payment on the ordinary shares was 4 per cent., less tax, for 1931.

Plundell, Spence and Co.—The directors report a profit for the year to October 31 last of £36,667 (£47,445); adding £10,691 brought in, makes £47,358. A dividend on ordinary shares of 6 per cent., less tax (same), is announced.

International Nickel Co. of Canada.—A quarterly dividend of 50 cents is announced on the common stock. Payment will be made on March 31. A payment of 25 cents was made last March. In June 30 cents was distributed, followed by 35 cents in September and 40 cents in December, making a total of $1.30 for 1936.

Lancegaye Safety Glass (1934).—The directors have decided to pay a second interim dividend of 7 per cent., actual, less tax, in respect of the year ending March 31 next. This makes, with a similar dividend in November last, 14 per cent., less tax, to date for 1936-37, which compares with an aggregate of 6 per cent., less tax, for the preceding year. Of the £200,000 authorised capital, £113,244 5s. is in issue in shares of 1s. each, which includes £372 7s. of unclaimed shares.

English Clays Lovering Pochin.—The report for the year ended September 30, 1936, states that, after payment of directors' fees, interest charges and after making provision for bad debt reserve, the profit was £145,791 (£161,581); deduct depreciation of plant and machinery £22,008, provision for income-tax £18,048, transfer to leasehold and mortgage redemption reserve £15,000, transfer to general reserve £10,000, dividend on 5½ per cent. preference shares from date of issue to March 31, 1936, net £1,203, dividend on 7 per cent. second preference shares for half year to March 31, 1936, net £9,918, and interim dividend on ordinary shares, less tax, net £16,866, leaving £52,748; add amount brought forward £20,124, making £72,872; dividends on first preference shares and second preference shares for half-year to September 30, 1936, amounting to £18,386 net were paid, leaving available £54,486. The directors recommend a final dividend of 2 per cent., less tax, making 3 per cent., less tax, for the year (same) on the ordinary shares, absorbing £33,732, and carrying forward £20,754.

New Companies Registered

Acme Soap Co., Ltd., Townley Works, Gibbon Street, Bradford, Manchester.—Registered January 22. Nominal capital £3,000. To acquire the business carried on by M. O'Callaghan at Townley Works, Gibbon Street, Bradford, Manchester, and to carry on the business of manufacture of and dealers in soaps and washing materials, oils, greases, perfumes, etc. Directors: Michael O'Callaghan and W. Campbell.

Dixon Soap Co., Ltd.—Registered January 20. Nominal capital £1,000. To acquire the business of a soap manufacturer carried on by Wm. H. Dixon at Whitworth Street East, Openshaw, Manchester, as the "Pioneer Soap Company." Directors: Wm. H. Dixon, 11 Lunn Avenue, Abbey Hey, Gorton, Manchester; H. Abelson and G. O. Franks.

Eglinton Yates and Co., Ltd., Linwood Lodge, Warwick Road, Knowle, Warwickshire.—Registered January 22. Nominal capital £13,000. To acquire the business of a manufacturing chemist formerly carried on by the late Wm. Henry Yates under his own name and in the name of Eglinton Yates & Co., at Knowle, Warwickshire, which business was recently the property of Louisa Yates and William Howard Yates, executors and residuary beneficiaries under the will of the said William Henry Yates. Directors: Louisa Yates, W. H. Yates, J. Haddlesey and T. R. Tear.

The Physicians' and Surgeons' Trust, Ltd.—Registered January 21. Nominal capital £5,000. Chemists, druggists, pill manufacturers, herbalists, chemists' and druggists' sundriesmen, dealers in first-aid outfits, elastic and rubber goods, optical, surgical and scientific instruments, etc. Directors: Sidney G. Burtwell, 35 Friends Road, Croydon; F. J. Bell, and F. M. Parris.

Research Laboratories, Ltd.—Registered January 25. Nominal capital £500. Manufacturers of and dealers in chemicals, gases, drugs, medicines, etc. Subscribers: Fred Robertshaw, "Braeside," Straightacres Lane, Eccleshill, Bradford; and T. W. Jennings.

New Chemical Trade Marks

Compiled from official sources by Gee and Co., patent and trade mark agents, Staple House, 51 and 52 Chancery Lane, London, W.C.2.

Uniexol. 570,144. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. Union Glue and Gelatine Co., Limited, Cransley Works, Garrett Street, Golden Lane, London, E.C.1. July 10, 1936.

Oitioil. 568,910. Drying oils being raw or partly prepared vegetable substances used in manufactures not included in other classes. Brasil Oiticica, S.A., Avenida Barao de Teffé No. 94, Rio de Janeiro, Brazil; May 19, 1936. Address for Service in the United Kingdom is, c/o Henry Fairbrother, 30 and 32 Ludgate Hill, London, E.C.4.